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Truck Crops

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# Truck Crop Production Practices

## MONTEREY COUNTY, CALIFORNIA

Labor, Power, and Materials
by Operation

Farm Production Economics Division
Economic Research Service
U. S. Department of Agriculture

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Crossley S-D Surveys, Inc., New York City, N. Y., prepared the sample, conducted the field interviewing, and tabulated the statistical data under a contract with the U. S. Agricultural Research Service, of which the Farm Economics Division was then a part.

## HOW TO USE THE DATA

Different kinds of data are needed for different purposes. Some persons have need for data on average labor, power, and material inputs, while others, particularly county agents and farm budgeters, prefer data for usual or typical labor, power, and material inputs. The data in this report are presented in such a way as to satisfy both these needs.

Tables 1 and 2 contain information on the characteristics of farms in the sample. The remaining tables are for specific crops. There are four tables and a chart for each crop. These four sets of tables are not numbered in the usual way but are designated by the letters A, B, C, and D.

The tables lettered A present quantities and costs of materials used and of contract work hired per acre. Cost items included are direct costs only; they do not include charges for such items as land, overhead labor, and capital. Data that present only direct costs are somewhat limited in use. They are applicable in computing costs incurred in connection with crop insurance programs and are useful in partial farm budgeting to compare costs of producing alternative crops when charges for overhead labor, machinery, land, and so on, are the same for either crop and, hence, need not be taken into account.

These data are not appropriate and would be misleading for use as the sole criteria in judging whether or not a farmer made a profit on a crop or whether he should stay in business, or in making cost comparisons with crops grown in other areas. For these purposes, total costs are required.

Tables designated B present the various operations performed on the crops, the most common size of equipment used, the average number of times the operation was performed, the acreage covered, the man and power inputs per acre, and the total labor and power used per acre. These data do not reflect an accurate picture of operations or inputs on any one farm; they are averages of all operations and inputs.

Tables designated C present usual or typical labor and power inputs by operation. The accompanying charts show the seasonality of the operation by periods.

Tables designated D present for each operation the composition of the work force by major sources of workers.

Data in these tables were obtained from a sample of growers and are subject to sampling error. For some crops, particularly those having limited numbers of observations, large sampling errors are possible. Therefore, these data should be considered as approximations.

Tables A, B, and D are offered for those persons interested in average requirements. However, extension economists, county agents, farm budgeters, and others may have more use for the data on usual or typical situations shown in table C for each crop.

Farm labor placement officials and others concerned with the problem of obtaining and placing workers may find tables B and D and the charts of value in determining the number of workers necessary for each operation, and the period of time during which local seasonal workers and those from other areas will be needed to supplement the regular farm labor force.

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Previous publications in this group of reports on 1959 truck crop production practices covered the following areas:

| Publication No. | Area Covered |
|---|---|
| ARS 43-132 | Columbia County, Wis. |
| ERS-45 | Accomack and Northampton Counties, Va. |
| ERS-79 | Broward and Palm Beach Counties, Fla. |
| ERS-82 | Colquitt County, Ga. |
| ERS-115 | Cameron and Hidalgo Counties, Tex. |
| ERS-128 | Imperial County, Calif. |

Washington, D. C. November 1963

# TRUCK CROP PRODUCTION PRACTICES
# MONTEREY COUNTY, CALIFORNIA

Labor, Power, and Materials, by Operation

By

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## INTRODUCTION

In 1962 U. S. production of truck crops for fresh market and processing occupied 3.4 million acres of cropland. These crops used slightly more than 1 percent of the total cropland. The farm value of truck crops harvested for sale exceeded $1.2 billion, or an average of $357 per acre harvested.1/

Although the total acreage of truck crops is small, it is highly concentrated in areas with conditions favorable for production of these crops. The major areas are in California, Florida, Texas, the Eastern Seaboard from Georgia to Long Island, N. Y., the States bordering the Great Lakes, and the Pacific Northwest.

Truck crops in general require intensive labor. These requirements are highly seasonal – with several labor peaks – the highest occurring at harvesttime.

Most truck-crop operations other than land preparation are difficult to mechanize. Thinning and weeding are two preharvest operations still performed largely by hand labor. Harvesting of a majority of truck crops is still predominantly a hand operation. Most of these crops require repetitive pickings, which must be timely, as quality deteriorates very rapidly if the crops are not harvested at the optimum time.

These high labor demands have been difficult to meet, particularly during peak periods of weeding, thinning, and harvesting. Most truck-crop areas do not have sufficient local labor available to handle the crops during these periods. This has led many thousands of workers to migrate from one area to another during the peak seasons. In addition, many thousands of foreign workers are imported annually to help satisfy these heavy seasonal labor demands.

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1/ U. S. Department of Agriculture Crop Reporting Board. Vegetables – Fresh Market 1962 Annual Summary – Acreage, Production, and Value of Principal Commercial Crops. Vg. 2-2-(62).

U. S. Department of Agriculture Crop Reporting Board. Vegetables – Processing 1962 Annual Summary – Acreage, Production, and Value of Principal Commercial Crops. Vg. 3-2-(62).

Purchased inputs comprise a high proportion of the total inputs in the production of these crops. Most labor is hired. Fertilizer, seed, pesticides, and containers are significant items that are usually purchased. From 1953 to 1962, prices of these inputs increased relative to prices received for truck crops.

To gain further knowledge of some of the inputs involved in production of vegetables, information regarding the 1958-59 crop was obtained from 2,496 vegetable growers in 12 areas.2/ The areas sampled were the counties of (1) Erie, N. Y., (2) Accomack and Northampton, Va., (3) Colquitt, Ga., (4) Broward and Palm Beach, Fla., (5) Cameron and Hidalgo, Tex., (6) Berrien and Van Buren, Mich., (7) Columbia, Wis., (8) Yakima, Wash., (9) Marion, Oreg., (10) Imperial, Calif., (11) Monterey, Calif., and (12) San Joaquin, Calif.

The areas included in the survey were selected on the basis of importance of seasonal and overall production, diversity of crops grown – both for fresh market and for processing – and number and proportion of farmers harvesting truck crops for sale.3/

The survey population was defined as all farmers producing truck crops for sale whose farm headquarters were located within the survey area, except those residing outside the county and more than 20 road miles from their headquarters in the survey area. Within the survey area, a randomized area sampling plan was used to obtain the desired number of respondents.

This is the seventh in a group of 12 publications containing information on labor requirements, production practices, and costs involved in the production of truck crops for fresh market and processing. Information in this report was obtained from 121 producers in Monterey County, Calif. The area studied is shown in figure 1.

A separate report covering all 12 areas will give information on the extent to which production of truck crops has become vertically integrated by either ownership or contractual agreements.

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2/ The Crossley S-D Surveys, Inc., under U. S. Department of Agriculture, Agricultural Research Service contract #12-14-100-3826 (43) conducted the field survey and made preliminary tabulations. The author is responsible for the analysis of the data.

3/ Based on data cited in footnote 1 as well as the 1958 annual summaries of the same series; also the U. S. Department of Commerce Census of Agriculture, vols. I and II, 1954.

CALIFORNIA
Major spring vegetable-producing counties
Sample county ( Monterey )

Figure 1

## CHARACTERISTICS OF MONTEREY COUNTY, CALIFORNIA

California leads the Nation in the production of truck crops, ranking first in the production of fresh market vegetables, and second among States producing vegetables for processing in 1962 (see footnote 1, p. 1).4/ The 1959 Census reported vegetables harvested for sale from 657,344 acres on 5,856 California farms. The value of these sales was nearly $269 million.4/

Monterey County is a substantial contributor to California vegetable production. In 1959, sales of vegetables exceeded $40,505,000, or more than 15 percent of the State total. Fewer than 6 percent of the State's vegetable farms were located in Monterey County, but they accounted for over 14 percent of the harvested acreage of vegetables.4/

Monterey County and, more specifically, Salinas Valley is the lettuce capital of the country. In 1959, this one county harvested more than 20 percent of the entire lettuce acreage in the United States.

Lettuce and other cool-weather crops, such as artichokes, broccoli, cauliflower, and cabbage, find climatic conditions in the Salinas Valley nearly ideal. Day-night temperature differentials are low, humidity is high, soil and air temperatures are on the cool side. These climatic characteristics occur as a result of the land formation and prevailing breezes. The Santa Lucia mountain range on the west extends from Carmel southeastward the entire length of the county. This range blocks off much of the cold sea air. To the east, the Gabilan and Diablo mountain ranges form a similar barrier to the hot dry air from the central valley. Cold moist sea air carried by prevailing west and northwest breezes flow across Monterey Bay and southeastward up the valley. Temperature is coolest at bayside, but increases on up the valley as the air is moderated by its flow over land. Cool-weather crops and particularly artichokes, broccoli, and lettuce are produced primarily in the northern end of the valley.

Rainfall is highly variable, most of it occurring in the winter months. Irrigation is required on all crops except during the rainy period in winter.

Late in 1959, information regarding the 1958-59 production of truck crops was obtained by interviewing operators of 125 farms. The survey farms represented a 37 percent sample of all farms harvesting truck crops for sale. On the average, the survey farms had 247.8 acres of cropland. Vegetables were grown on 142.1 acres, or about 57 percent of the cropland. Most vegetable production was for fresh market use, but spinach, tomatoes, and a few other crops grown for processing occupied an average of 20.4 acres per farm. More than half of the farms grew only one truck crop. Only about one-fifth of the farms produced three or more crops (table 1).

Lettuce is by far the number one truck crop in the county. This crop was grown on 44 percent of the survey farms, and accounted for 58 percent of the vegetable acreage. On farms where grown, this crop averaged 186.1 acres (table 2).

This report presents information on the production and harvesting of seven crops grown for the fresh market and two grown for processing.

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4/ U. S. Department of Commerce Census of Agriculture v. 1, pt. 48. 1959.

Table 1.--Sample farms: Number, average acreage of cropland, and distribution of truck crops produced by farms in each size group, Monterey County, Calif., 1958-59

| Cropland operated (acres) | Farms in size groups | Average acreage of cropland per farm | Distribution of farms by number of crops produced | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 |
| | Number | Acres | Farms | Farms | Farms | Farms | Farms | Farms |
| Under 30.0 ------ | 18 | 11.5 | 13 | 2 | 1 | 1 | --- | 1 |
| 30.0 - 99.0 ------ | 22 | 66.3 | 14 | 7 | --- | 1 | --- | --- |
| 100.0 - 149.9 ---- | 22 | 116.0 | 14 | 6 | 1 | 1 | --- | --- |
| 150.0 - 224.9 ---- | 20 | 190.0 | 8 | 7 | 5 | --- | --- | --- |
| 225.0 - 299.9 ---- | 17 | 253.1 | 12 | 2 | 2 | 1 | --- | --- |
| 300.0 - 639.9 ---- | 12 | 420.5 | 3 | 4 | 3 | 1 | 1 | --- |
| 640.0 - 1,399.9 -- | 5 | 769.4 | 1 | 2 | --- | 1 | 1 | --- |
| 1,400.0 and over - | 5 | 1,752.8 | 1 | 1 | 3 | --- | --- | --- |
| Total or average --- | 121 | 247.8 | 66 | 31 | 15 | 6 | 2 | 1 |

Table 2.--Truck crops grown for fresh market and for processing on 121 farms, by acreage harvested, Monterey County, Calif., 1958-59

| Crop | Farms on which crops were grown for – | | Acreage harvested | | | Average acreage harvested per farm | | |
|---|---|---|---|---|---|---|---|---|
| | Fresh market | Processing | Fresh market | Processing | Total | Fresh market | Processing | Total |
| | Number | Number | Acres | Acres | Acres | Acres | Acres | Acres |
| Artichokes ---------- | 8 | --- | 814.0 | --- | 814.0 | 101.8 | --- | 101.8 |
| Broccoli ---------- | 12 | --- | 826.5 | --- | 826.5 | 68.9 | --- | 68.9 |
| Carrots ---------- | 30 | 1 | 1,004.0 | 50.0 | 1,054.0 | 33.5 | 50.0 | 35.1 |
| Celery ---------- | 12 | --- | 877.0 | --- | 877.0 | 73.1 | --- | 73.1 |
| Lettuce ---------- | 55 | --- | 10,234.0 | --- | 10,234.0 | 186.1 | --- | 186.1 |
| Onions ---------- | 10 | 2 | 495.5 | 85.0 | 580.5 | 49.6 | 42.5 | 48.4 |
| Spinach ---------- | 7 | 8 | 398.0 | 466.0 | 864.0 | 56.9 | 58.2 | 57.6 |
| Tomatoes ---------- | 6 | 21 | 191.0 | 1,393.0 | 1,584.0 | 31.8 | 66.3 | 58.7 |
| Other 1/ ---------- | --- | --- | 378.0 | 554.0 | 932.0 | --- | --- | --- |
| Total ---------- | --- | --- | 15,218.0 | 2,548.0 | 17,766.0 | --- | --- | --- |

1/ Includes 378.0 acres of green lima beans, snap beans, cabbage, sweet corn, cucumbers, green onions, green peas, squash, and strawberries for fresh market use, and 554.0 acres of green lima beans, snap beans, garlic, green peas, and strawberries for processing.

## VEGETABLES FOR FRESH MARKET

Truck crops are classified as fresh market vegetables if they were intended for this use at time of planting and were sold as such at time of harvesting.

In this section, all vegetables were grown and harvested for fresh market use, except tomatoes. Substantial production of ripe tomatoes was sold to processors from the fresh market tomato acreage. Yield, labor, and power inputs per acre reflect only that portion sold for fresh market use.

### Artichokes

Figure 2 and tables A, B, C, and D present data in artichoke production from 769 acres on 7 farms in the 1958-59 crop year. The average yield per acre was 196 boxes, or approximately 3,920 pounds.

Tractors were the chief source of power on these farms. Size of tractor was not obtained in the survey, but size of equipment used on these operations indicates that the average tractor is about a 3-plow tractor with a drawbar horsepower rating of 20 to 30. Major land preparation—plowing, disking and leveling—was done with crawler tractors of 40 to 60 horsepower.

Artichokes are perennials. New growth forms from old root crowns. Each successive year more crowns develop until overcrowding produces inferior buds; then, replanting is necessary. Two growers indicated their fields were set more than 20 years ago. Two other growers, set new plants in 1958.

Irrigation is started shortly after the old growth has been destroyed, and is continued until the winter rains start. Harvesting begins in August, but the heaviest cuttings are from December to March. During this period, each field is harvested about once every 5 to 8 days.

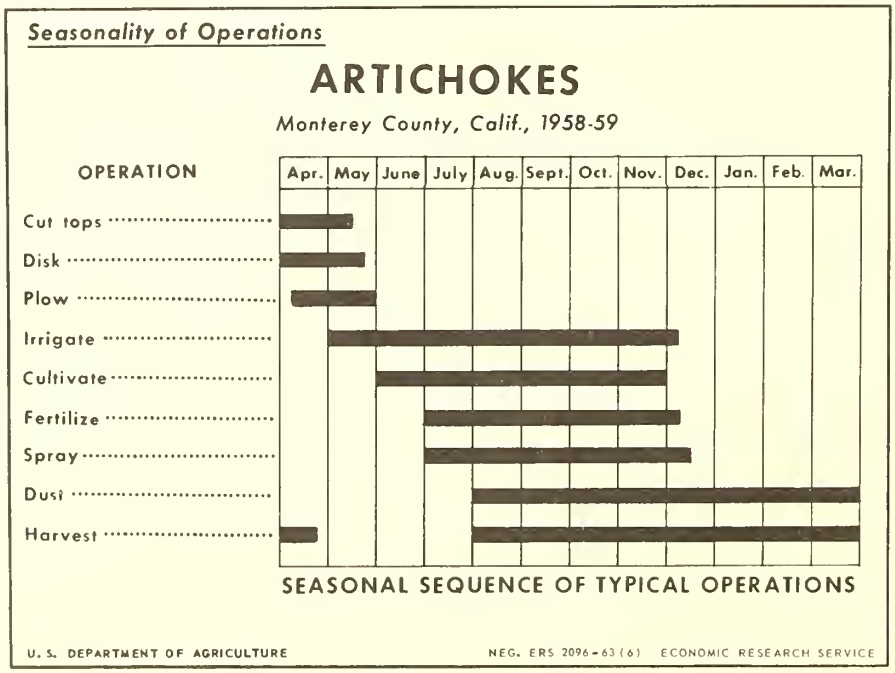


Figure 2

Table A.--Artichokes: Materials used and contract work hired, averages for 769 acres on 7 farms, Monterey County, Calif., 1958-59

| Item | Unit | Units per acre covered | Price per unit | Cost per acre covered | Percentage of total acreage covered | Cost per acre, total acreage |
|---|---|---|---|---|---|---|
| | | Number | Dollars | Dollars | Percent | Dollars |
| Materials used: | | | | | | |
| Fertilizer nutrients - | | | | | | |
| N | Pound | 217.3 | 1/ | 1/ | 100 | 44.51 |
| $P_2O_5$ | Pound | 79.5 | 1/ | 1/ | 82 | |
| $K_2O$ | Pound | 32.9 | 1/ | 1/ | 82 | |
| Manure | Ton | 5.5 | 8.00 | 44.00 | 30 | 13.20 |
| Irrigation fees | Acre-inch | 42.0 | .23 | 9.66 | 100 | 9.66 |
| Containers | Each | 196.0 | .25 | 49.00 | 100 | 49.00 |
| Total | --- | --- | --- | --- | --- | 116.37 |
| Contract work hired: | | | | | | |
| Spray by plane, includes materials | Acre | 2.9 | 6.50 | 18.85 | 69 | 13.01 |
| Dust by plane, includes materials | Acre | 9.4 | 6.14 | 57.72 | 84 | 48.48 |
| Fertilize, application only | Acre | 3.7 | 2.00 | 7.40 | 82 | 6.07 |
| Total | --- | --- | --- | --- | --- | 67.56 |
| Total materials and contract work | --- | --- | --- | --- | --- | 2/ 183.93 |

1/ Data not available.
2/ Average yield per acre-3,920 pounds. Average cost of materials and contract work per cwt.-$4.69.

Table B.--Artichokes: Labor, power, and machinery used in producing and harvesting, averages for 769 acres on 7 farms, Monterey County, Calif., 1958-59

| Operation | Type and size of equipment | Time per acre, once over | | Times over, acreage covered | Percentage of total acreage covered | Time per acre, total acreage | |
|---|---|---|---|---|---|---|---|
| | | Man | Power | | | Man | Power |
| | | Hours | Hours | Number | Percent | Hours | Hours |
| Preharvest: | | | | | | | |
| Cut tops | 6-foot cutter | 1.1 | 1.1 | 1.0 | 70 | 0.8 | 0.8 |
| Burn tops | --- | 25.0 | --- | 1.0 | 3 | .8 | --- |
| Disk | 8-foot disk | .8 | .8 | 1.0 | 84 | .7 | .7 |
| Plow | 7-foot disk plow | 1.0 | 1.0 | 1.0 | 82 | .8 | .8 |
| Trench | 3-foot plow | .8 | .8 | 1.0 | 39 | .3 | .3 |
| Bury tops | --- | 33.6 | --- | 1.0 | 39 | 13.1 | --- |
| Level | 8-foot scraper | .7 | .7 | 1.0 | 13 | .1 | .1 |
| Mark | 2-row marker | .5 | .5 | 1.0 | 18 | .1 | .1 |
| List | 7-foot lister | 1.5 | 1.5 | 1.0 | 12 | .2 | .2 |
| Chisel | 7-foot chisel | 1.9 | 1.9 | 3.5 | 30 | 2.0 | 2.0 |
| Plant | --- | 30.3 | --- | 1.0 | 30 | 9.1 | --- |
| Irrigate | --- | 2.6 | --- | 7.5 | 100 | 19.5 | --- |
| Cultivate | 5-foot cultivator | 1.1 | 1.1 | 7.6 | 75 | 6.3 | 6.3 |
| Fertilize (custom) | 7-foot applicator | .6 | .6 | 3.7 | 82 | 1.8 | 1.8 |
| Fertilize | 7-foot applicator | .6 | .6 | 2.5 | 18 | .3 | .3 |
| Apply manure | Truck | 3.0 | 1.5 | 1.4 | 30 | 1.3 | .6 |
| Spray (custom) | Plane | 1/ | 1/ | 2.9 | 69 | .1 | .1 |
| Dust (custom) | Plane | 1/ | 1/ | 9.4 | 84 | .3 | .3 |
| Total | --- | --- | --- | --- | --- | 57.6 | 14.4 |
| Harvest: | | | | | | | |
| Cut and pack | --- | 2.4 | --- | 27.1 | 100 | 65.0 | --- |
| Total | --- | --- | --- | --- | --- | 65.0 | --- |
| Total preharvest and harvest | --- | --- | --- | --- | --- | 2/ 122.6 | 2/ 14.4 |

1/ Less than 0.05 hour.
2/ Average yield per acre—3,920 pounds. Average labor and power used per cwt.—3.1 hours and 0.4 hour, respectively.

Table C.--Artichokes: Usual labor and power inputs, Monterey County, Calif., 1958-59

| Operation | Times over | Time per acre, once over | | Time per acre, total | |
|---|---|---|---|---|---|
| | | Man | Power | Man | Power |
| | Number | Hours | Hours | Hours | Hours |
| Cut tops | 1 | 1.1 | 1.1 | 1.1 | 1.1 |
| Disk | 1 | .8 | .8 | .8 | .8 |
| Plow | 1 | 1.0 | 1.0 | 1.0 | 1.0 |
| Irrigate | 8 | 2.6 | --- | 20.8 | --- |
| Cultivate | 8 | 1.1 | 1.1 | 8.8 | 8.8 |
| Fertilize (custom) | 4 | .6 | .6 | 2.4 | 2.4 |
| Spray (custom) | 3 | 1/ | 1/ | .1 | .1 |
| Dust (custom) | 9 | 1/ | 1/ | .3 | .3 |
| Cut and pack | 27 | 2.4 | --- | 64.8 | --- |
| Total | --- | --- | --- | 100.1 | 14.5 |

1/ Less than 0.05 hour.

Table D.--Artichokes: Distribution of workers performing specified operations, by type of worker, 7 farms, Monterey County, Calif., 1958-59

| Operation | Type of worker | | | | |
|---|---|---|---|---|---|
| | Operator and unpaid family | Year-round hired | Local seasonal | Foreign | Custom |
| | Percent | Percent | Percent | Percent | Percent |
| Cut tops | 17 | 83 | 0 | 0 | 0 |
| Burn tops | 0 | 0 | 45 | 55 | 0 |
| Disk | 20 | 60 | 20 | 0 | 0 |
| Plow | 14 | 72 | 14 | 0 | 0 |
| Trench | 0 | 100 | 0 | 0 | 0 |
| Bury tops | 0 | 0 | 40 | 60 | 0 |
| Level | 100 | 0 | 0 | 0 | 0 |
| Mark | 0 | 50 | 50 | 0 | 0 |
| List | 0 | 0 | 100 | 0 | 0 |
| Chisel | 100 | 0 | 0 | 0 | 0 |
| Plant | 0 | 4 | 79 | 17 | 0 |
| Irrigate | 0 | 7 | 93 | 0 | 0 |
| Cultivate | 0 | 100 | 0 | 0 | 0 |
| Fertilize | 0 | 12 | 0 | 0 | 88 |
| Apply manure | 0 | 0 | 100 | 0 | 0 |
| Spray | 0 | 0 | 0 | 0 | 100 |
| Dust | 0 | 0 | 0 | 0 | 100 |
| Harvest | 0 | 38 | 40 | 22 | 0 |

## Broccoli

Figure 3 and tables A, B, C, and D present data on broccoli grown for the fresh market on 560 acres on 11 farms in 1958-59. The average yield per acre was 6,311 pounds.

Tractors were the chief source of power on these farms. Size of tractor was not obtained in the survey, but size of equipment used indicates the average tractor to be about a 3-plow tractor with a drawbar horsepower rating of 20 to 30. Heavy duty crawler tractors were used on some of the preplant operations.

The most time consuming preharvest operation in the production of broccoli is thinning. Most growers reported this operation as one for which they paid their workers piece rates. Rates ranged from $19.50 to $25.00 per acre.

Harvesting required the most labor of all. An average of 61.7 hours was used to cut an acre. Fields were harvested from 3 to 14 times, the average being 5.5 separate cuttings. Data on related harvesting operations – pack, load, and haul – were not obtained in the survey. Therefore, these harvesting hours should not be used for budgeting without an upward revision to compensate for the packing, loading, and hauling operations.

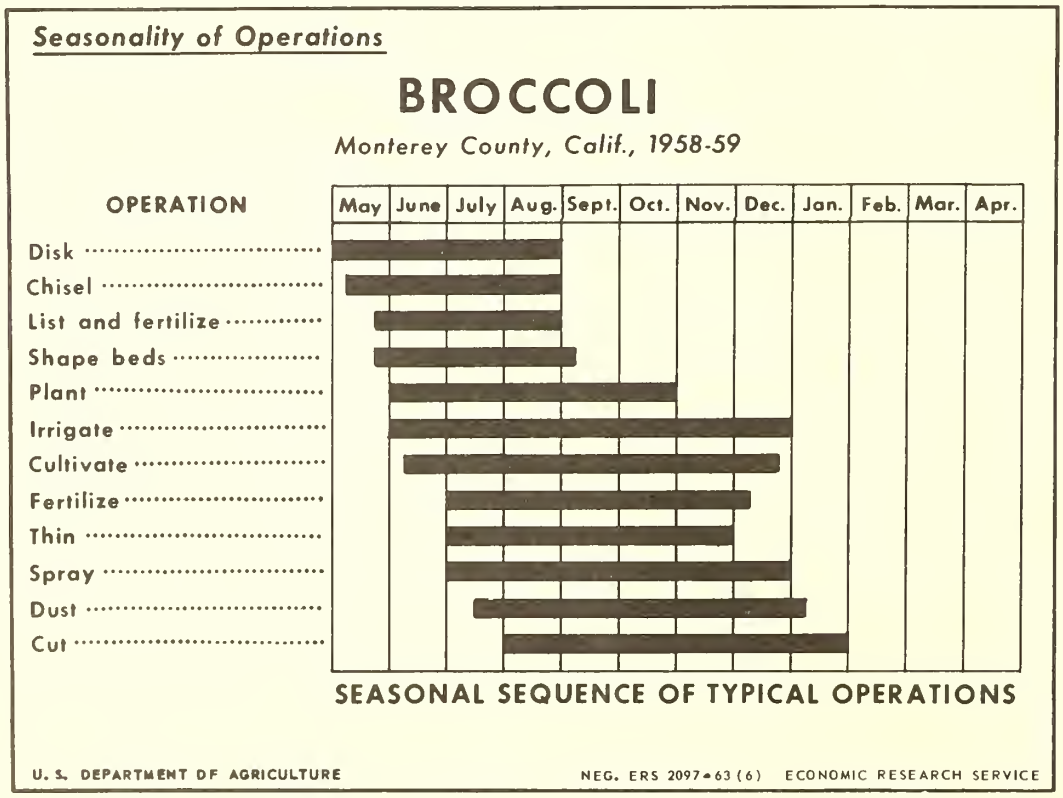


Figure 3

Table A.--Broccoli: Materials used and contract work hired, averages for 560 acres on 11 farms, Monterey County, Calif., 1958-59

| Item | Unit | Units per acre covered | Price per unit | Cost per acre covered | Percentage of total acreage covered | Cost per acre, total acreage |
|---|---|---|---|---|---|---|
| | | Number | Dollars | Dollars | Percent | Dollars |
| Materials used: | | | | | | |
| Seed | Pound | 2.2 | 3.55 | 7.81 | 100 | 7.81 |
| Fertilizer nutrients - | | | | | | |
| N | Pound | 134.5 | 1/ | 1/ | 100 | |
| $P_2O_5$ | Pound | 90.4 | 1/ | 1/ | 87 | 28.73 |
| $K_2O$ | Pound | 54.7 | 1/ | 1/ | 79 | |
| Spray materials | Acre | 1.9 | 7.80 | 14.82 | 67 | 9.93 |
| Dust materials | Acre | 2.6 | 9.95 | 25.87 | 34 | 8.80 |
| Irrigation fees | Acre-inch | 30.0 | .23 | 6.90 | 100 | 6.90 |
| Containers | Each | 140.0 | .36 | 50.40 | 100 | 50.40 |
| Total | --- | --- | --- | --- | --- | 112.57 |
| Contract work hired: | | | | | | |
| Spray by boom sprayer, application only | Acre | 1.9 | 2.38 | 4.52 | 64 | 2.89 |
| Spray by plane, application only | Acre | 2.0 | 2.00 | 4.00 | 8 | .32 |
| Dust by plane, application only | Acre | 2.6 | 2.00 | 5.20 | 34 | 1.77 |
| Dust by plane, includes dust | Acre | 2.0 | 10.00 | 20.00 | 27 | 5.40 |
| Fertilize, application only | Acre | 2.2 | 1.96 | 4.31 | 52 | 2.24 |
| List and fertilize, no materials | Acre | 1.0 | 2.67 | 2.67 | 40 | 1.07 |
| Cultivate and fertilize, no materials | Acre | 1.0 | 2.00 | 2.00 | 14 | .28 |
| Total | --- | --- | --- | --- | --- | 13.97 |
| Total, materials and contract work | --- | --- | --- | --- | --- | 2/ 126.54 |

1/ Data not available.
2/ Average yield per acre - 6,311 pounds. Average costs of materials and contract work per hundredweight - $2.00.

Table B.--Broccoli: Labor, power, and machinery used in producing and harvesting, averages for 560 acres on 11 farms, Monterey County, Calif., 1958-59

| Operation | Type and size of equipment | Time per acre, once over | | Times over, acreage covered | Percentage of total acreage covered | Time per acre, total acreage | |
|---|---|---|---|---|---|---|---|
| | | Man | Power | | | Man | Power |
| | | Hours | Hours | Number | Percent | Hours | Hours |
| Preharvest: | | | | | | | |
| Plow | 3-bottom disk | 1.2 | 1.2 | 1.0 | 19 | 0.2 | 0.2 |
| Disk | 12-foot disk | .8 | .8 | 2.2 | 100 | 1.8 | 1.8 |
| Chisel | 9-foot chisel | 1.0 | 1.0 | 1.2 | 75 | .9 | .9 |
| List | 3-bed lister | .8 | .8 | 1.0 | 25 | .2 | .2 |
| List and fertilize (custom) | 3-bed lister/attach. | .6 | .4 | 1.0 | 40 | .2 | .2 |
| Shape beds | 3-bed roll | .5 | .5 | 1.0 | 61 | .3 | .3 |
| Float | 10 x 30-foot landplane | 1.0 | 1.0 | 1.0 | 22 | .2 | .2 |
| Plant | 2-bed seeder | 1.0 | .7 | 1.0 | 100 | 1.0 | .7 |
| Irrigate | --- | 3.1 | --- | 5.1 | 100 | 15.8 | --- |
| Cultivate | 2-bed cultivator | .7 | .7 | 3.3 | 100 | 2.3 | 2.3 |
| Cultivate and fertilize (custom) | 2-bed cult./attach. | .4 | .4 | 1.0 | 14 | .1 | .1 |
| Fertilize | 2-bed sidedresser | .5 | .4 | 1.4 | 36 | .3 | .2 |
| Fertilize (custom) | 2-bed sidedresser | .4 | .3 | 2.2 | 52 | .5 | .3 |
| Thin | --- | 31.4 | --- | 1.0 | 100 | 31.4 | --- |
| Spray (custom) | 8-bed boom sprayer | .1 | .1 | 1.9 | 64 | .1 | .1 |
| Spray (custom) | Plane | 1/ | 1/ | 2.0 | 8 | 1/ | 1/ |
| Dust (custom) | Plane | 1/ | 1/ | 2.3 | 61 | 1/ | 1/ |
| Hoe | --- | 11.4 | --- | 1.0 | 40 | 4.6 | --- |
| Total | --- | --- | --- | --- | --- | 59.9 | 7.5 |
| Harvest: | | | | | | | |
| Cut 2/ | --- | 12.2 | --- | 5.5 | 100 | 67.1 | --- |
| Total | --- | --- | --- | --- | --- | 67.1 | --- |
| Total preharvest and harvest | --- | --- | --- | --- | --- | 3/ 127.0 | 3/ 7.5 |

1/ Less than 0.05 hour.
2/ Excludes packing, loading, and hauling. Data for these operations were not obtained.
3/ Average yield per acre - 6,311 pounds. Average labor and power used per hundredweight - 2.0 hours and 0.1 hour, respectively

Table C.--Broccoli: Usual labor and power input per acre, Monterey County, Calif., 1958-59

| Operation | Times over | Time per acre, once over | | Time per acre, total | |
|---|---|---|---|---|---|
| | | Man | Power | Man | Power |
| | Number | Hours | Hours | Hours | Hours |
| Disk | 2 | 0.8 | 0.8 | 1.6 | 1.6 |
| Chisel | 1 | 1.0 | 1.0 | 1.0 | 1.0 |
| List and fertilize | 1 | .6 | .4 | .6 | .4 |
| Shape beds | 1 | .5 | .5 | .5 | .5 |
| Plant | 1 | 1.0 | .7 | 1.0 | .7 |
| Irrigate | 5 | 3.1 | --- | 15.5 | --- |
| Cultivate | 3 | .7 | .7 | 2.1 | 2.1 |
| Fertilize | 2 | .4 | .3 | .8 | .6 |
| Thin | 1 | 31.4 | --- | 31.4 | --- |
| Spray by boom sprayer | 2 | .1 | .1 | .2 | .2 |
| Dust by plane | 2 | 1/ | 1/ | 1/ | 1/ |
| Cut | 6 | 12.2 | --- | 73.2 | --- |
| Total | --- | --- | --- | 127.9 | 7.1 |

1/ Less then 0.05 hour.

Table D.--Broccoli: Distribution of workers performing specified operations, by type of worker, 11 farms, Monterey County, Calif., 1958-59

| Operation | Type of worker | | | | |
|---|---|---|---|---|---|
| | Operator and unpaid family | Year-round hired | Local seasonal | Foreign | Custom |
| | Percent | Percent | Percent | Percent | Percent |
| Plow | 25 | 75 | 0 | 0 | 0 |
| Disk | 17 | 61 | 22 | 0 | 0 |
| Chisel | 15 | 54 | 31 | 0 | 0 |
| List | 29 | 71 | 0 | 0 | 0 |
| List and fertilize | 0 | 0 | 0 | 0 | 100 |
| Shape beds | 30 | 41 | 29 | 0 | 0 |
| Float | 50 | 50 | 0 | 0 | 0 |
| Plant | 15 | 70 | 15 | 0 | 0 |
| Irrigate | 13 | 61 | 9 | 17 | 0 |
| Cultivate | 24 | 65 | 11 | 0 | 0 |
| Cultivate and fertilize | 0 | 0 | 0 | 0 | 100 |
| Fertilize | 8 | 38 | 0 | 0 | 54 |
| Thin | 0 | 0 | 14 | 86 | 0 |
| Spray | 0 | 0 | 0 | 0 | 100 |
| Dust | 0 | 0 | 0 | 0 | 100 |
| Hoe | 0 | 0 | 4 | 96 | 0 |
| Cut | 0 | 4 | 0 | 96 | 0 |

## Carrots

Figure 4 and tables A, B, C, and D cover production of carrots grown for the fresh market on 686 acres on 26 farms. The average yield per acre was 17.4 tons of topped carrots.

Tractors were the chief source of power on these farms. While size of tractor was not obtained in the survey, size of equipment used for operations listed indicates that the average tractor was about a 3-plow tractor with a drawbar horsepower rating of 20 to 30. Some preplant operations were performed by 40 to 60 horsepower crawler tractors.

Nearly half of the carrot acreage on the survey farms in Monterey County was grown under contract or agreement with a produce firm. Included in the agreement were certain cultural practices which are performed by the contractor, namely fertilization and pest control. The 26 farms from which detailed production data were obtained either had the produce firms or custom operators apply fertilizer, fumigants, and weedicides. Not one grower reported that he performed those operations.

Harvesting of the carrot crop was performed by produce firm crews or custom operators. Growers indicated that they sold their crops in the field, and thus did not have adequate information for reporting harvest labor and power inputs.

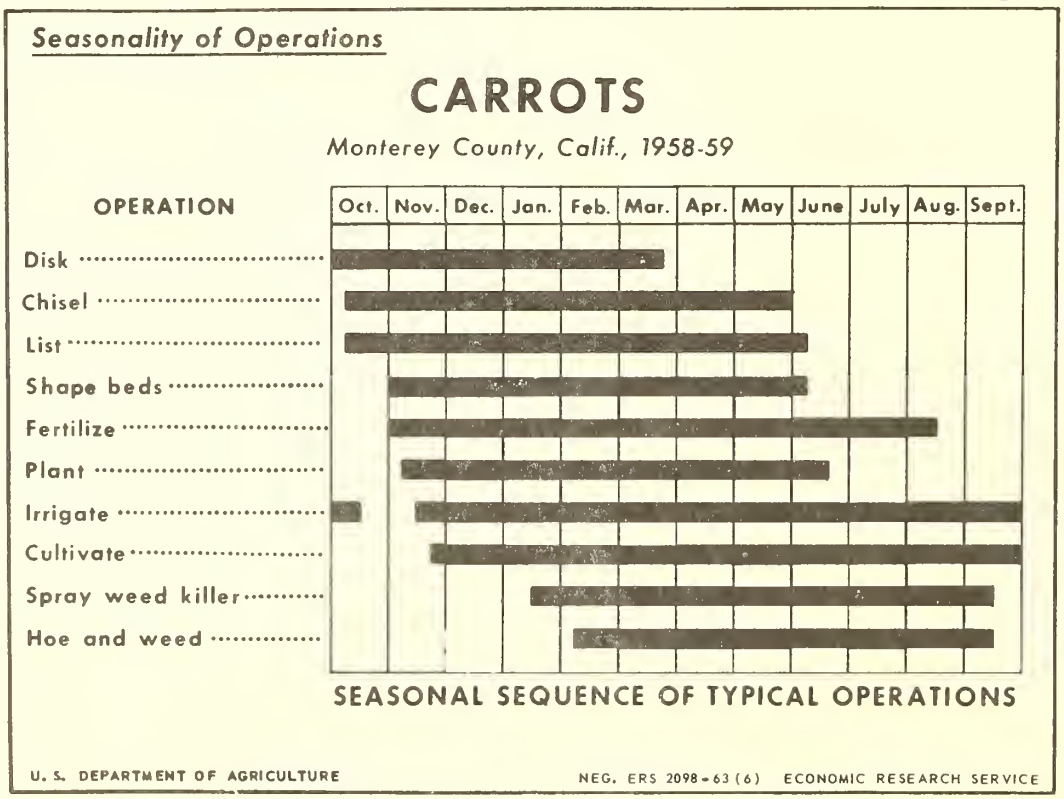


Figure 4

Table A.--Carrots: Materials used and contract work hired, averages for 686 acres on 26 farms, Montercy County, Calif., 1958-59

| Item | Unit | Units per acre covered | Price per unit | Cost per acre covered | Percentage of total acreage covered | Cost per acre, total acreage |
|---|---|---|---|---|---|---|
| | | Number | Dollars | Dollars | Percent | Dollars |
| Materials used: | | | | | | |
| Seed | Pound | 2.9 | 2.59 | 7.51 | 100 | 7.51 |
| Fertilizer nutrients – | | | | | | |
| N | Pound | 140.5 | 1/ | 1/ | 100 | |
| $P_2O_5$ | Pound | 75.4 | 1/ | 1/ | 98 | 34.54 |
| $K_2O$ | Pound | 46.2 | 1/ | 1/ | 59 | |
| Carrot oil | Gallon | 72.1 | .21 | 15.14 | 61 | 9.24 |
| Irrigation fees | Acre-inch | 36.0 | .23 | 8.28 | 100 | 8.28 |
| Total | --- | --- | --- | --- | --- | 59.57 |
| Contract work hired: | | | | | | |
| Fumigate, includes materials | Acre | 1.0 | 22.47 | 22.47 | 31 | 6.97 |
| Spray oil, includes oil | Acre | 1.3 | 17.30 | 22.49 | 24 | 5.40 |
| Spray oil, application only | Acre | 1.2 | 2.16 | 2.59 | 61 | 1.58 |
| List and fertilize, application only | Acre | 1.0 | 3.00 | 3.00 | 12 | .36 |
| List and fertilize, includes fertilizer | Acre | 1.0 | 13.95 | 13.95 | 6 | .84 |
| Fertilize, application only | Acre | 1.3 | 2.00 | 2.60 | 68 | 1.77 |
| Cultivate and fertilize, application only | Acre | 1.6 | 2.02 | 3.23 | 23 | .74 |
| Total | --- | --- | --- | --- | --- | 17.66 |
| Total, materials and contract work | --- | --- | --- | --- | --- | 2/ 77.23 |

1/ Data not available.
2/ Average yield per acre – 17.4 tons. Average cost of materials and contract work per ton – $4.44.

Table B.--Carrots: Labor, power, and machinery used in producing and harvesting, averages for 686 acres on 26 farms, Monterey County, Calif., 1958-59 1/

| Operation | Type and size of equipment | Time per acre, once over | | Times over, acreage covered | Percentage of total acreage covered | Time per acre, total acreage | |
|---|---|---|---|---|---|---|---|
| | | Man | Power | | | Man | Power |
| | | Hours | Hours | Number | Percent | Hours | Hours |
| Preharvest: | | | | | | | |
| Plow | 4-bot. moldbd. plow | 0.8 | 0.8 | 1.0 | 14 | 0.1 | 0.1 |
| Disk | 10-foot disk | .7 | .7 | 1.6 | 96 | 1.1 | 1.1 |
| Chisel | 8-foot chisel | .9 | .9 | 1.5 | 85 | 1.1 | 1.1 |
| Landplane | 10 x 30-foot landplane | 1.1 | 1.1 | 1.0 | 37 | .4 | .4 |
| List | 3-bed lister | .4 | .4 | 1.0 | 82 | .3 | .3 |
| List and fertilize (custom) | 3-bed lister/attach. | .5 | .5 | 1.0 | 18 | .1 | .1 |
| Fumigate (custom) | 2-bed applicator | .4 | .4 | 1.0 | 31 | .1 | .1 |
| Shape beds | 2-bed shaper | .6 | .6 | 1.0 | 100 | .6 | .6 |
| Fertilize (custom) | 2-bed applicator | .4 | .4 | 1.3 | 68 | .4 | .4 |
| Plant | 2-bed seeder | 1.0 | .6 | 1.0 | 100 | 1.0 | .6 |
| Irrigate | --- | 1.9 | --- | 5.3 | 100 | 10.1 | --- |
| Cultivate | 2-bed cultivator | .8 | .8 | 5.0 | 100 | 4.0 | 4.0 |
| Cultivate and fertilize (custom) | 2-bed cult./attach. | .4 | .4 | 1.6 | 23 | .1 | .1 |
| Spray oil (custom) | 8-bed boom sprayer | .2 | .2 | 1.2 | 85 | .2 | .2 |
| Hoe and weed | --- | 10.0 | --- | 1.0 | 60 | 6.0 | --- |
| Total | --- | --- | --- | --- | --- | 2/25.6 | 2/9.1 |

1/ Inputs are for preharvest only. All 26 growers sold their crop in the field.
2/ Average yield per acre — 17.4 tons. Average preharvest labor and power used per ton — 1.5 hours and 0.5 hour, respectively.

Table C.--Carrots: Usual labor and power inputs, Monterey County, Calif., 1958-59

| Operation | Times over | Time per acre, once over | | Time per acre, total | |
|---|---|---|---|---|---|
| | | Man | Power | Man | Power |
| | Number | Hours | Hours | Hours | Hours |
| Disk | 2 | 0.7 | 0.7 | 1.4 | 1.4 |
| Chisel | 2 | .9 | .9 | 1.8 | 1.8 |
| List | 1 | .4 | .4 | .4 | .4 |
| Shape beds | 1 | .6 | .6 | .6 | .6 |
| Fertilize (custom) | 1 | .4 | .4 | .4 | .4 |
| Plant | 1 | 1.0 | .6 | 1.0 | .6 |
| Irrigate | 5 | 1.9 | --- | 9.5 | --- |
| Cultivate | 5 | .8 | .8 | 4.0 | 4.0 |
| Spray oil (custom) | 1 | .2 | .2 | .2 | .2 |
| Hoe and weed | 1 | 10.0 | --- | 10.0 | --- |
| Total | --- | --- | --- | 29.3 | 9.4 |

Table D.--Carrots: Distribution of workers performing specified operations, by type of worker, 26 farms, Monterey County, Calif., 1958-59

| Operation | Type of worker | | | | |
|---|---|---|---|---|---|
| | Operator and unpaid family | Year-round hired | Local seasonal | Foreign | Custom 1/ |
| | Percent | Percent | Percent | Percent | Percent |
| Plow | 33 | 67 | 0 | 0 | 0 |
| Disk | 48 | 41 | 11 | 0 | 0 |
| Chisel | 58 | 38 | 4 | 0 | 0 |
| Landplane | 70 | 30 | 0 | 0 | 0 |
| List | 58 | 38 | 4 | 0 | 0 |
| List and fertilize | 0 | 0 | 0 | 0 | 100 |
| Fumigate | 0 | 0 | 0 | 0 | 100 |
| Shape beds | 60 | 36 | 4 | 0 | 0 |
| Fertilize | 0 | 0 | 0 | 0 | 100 |
| Plant | 43 | 46 | 11 | 0 | 0 |
| Irrigate | 41 | 35 | 24 | 0 | 0 |
| Cultivate | 57 | 40 | 3 | 0 | 0 |
| Cultivate and fertilize | 0 | 0 | 0 | 0 | 100 |
| Spray oil | 0 | 0 | 0 | 0 | 100 |
| Hoe and weed | 1 | 2 | 42 | 55 | 0 |

1/ Includes work done by produce companies.

## Celery

Figure 5 and tables A, B, C, and D present data on the production of celery from 736 acres on 11 farms in 1958-59. The average yield per acre was 322 hundredweight.

Tractors were the chief source of power on these farms. While size of tractor was not obtained in the survey, equipment used for operations listed indicates that the average tractor was about a 3-plow tractor with a drawbar horsepower rating of 20 to 30. Power to disk and chisel was provided by 40- to 60-horsepower crawler tractors.

The seeding of celery can be performed after listing and bed shaping, or, as shown in table C, at the same time the field is listed. Bed shaping or rolling then would follow seeding. Most growers seeded after listing and bed shaping, but a greater proportion of the acreage was actually seeded in conjunction with listing. The savings in labor and power inputs per acre by combining seeding with listing are 0.7 man and 0.8 power hour. All growers reported that they contracted out the job of spraying and dusting. An appreciable amount of the spraying was for control of weeds. Data obtained, however, do not permit separating weed control from insect control.

Celery is harvested either field packed or shed packed. The survey farms reported 85 percent of the acreage was field packed. Harvesting inputs reported are for field packing of celery, as growers using the shed packing method did not report harvest inputs. In field packing, both crates and cartons were used. Labor used in harvesting varies little, regardless of container used.

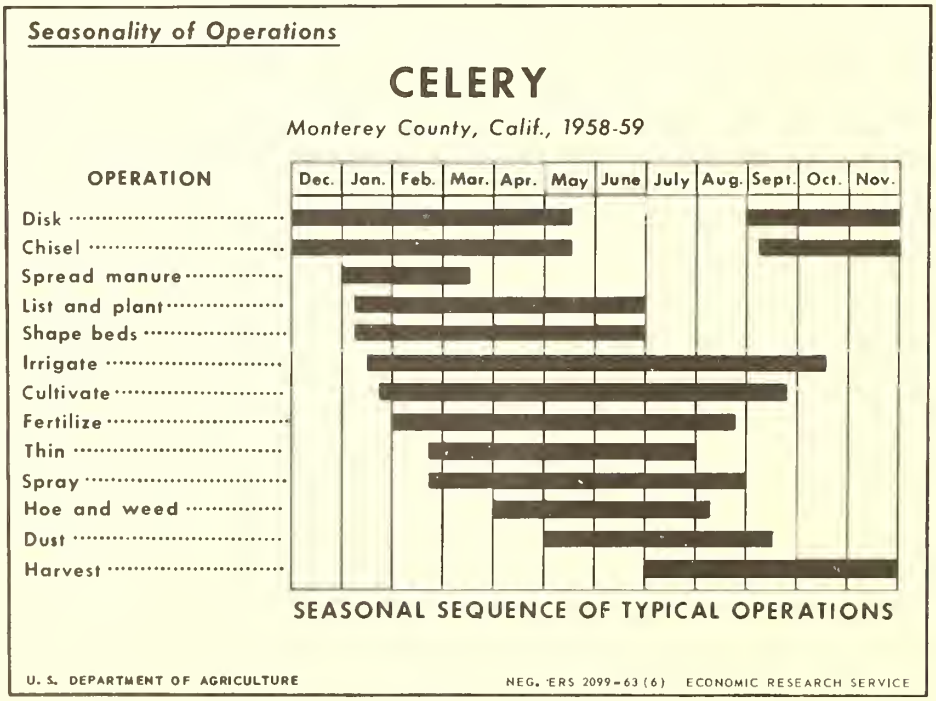


Figure 5

Table A.--Celery: Materials used and contract work hired, averages for 736 acres on 11 farms, Monterey County, Calif., 1958-59

| Item | Unit | Units per acre covered | Price per unit | Cost per acre covered | Percentage of total acreage covered | Cost per acre, total acreage |
|---|---|---|---|---|---|---|
| | | Number | Dollars | Dollars | Percent | Dollars |
| Materials used: | | | | | | |
| Seed | Pound | 1.1 | 20.51 | 22.56 | 100 | 22.56 |
| Manure | Ton | 7.7 | 8.55 | 65.84 | 73 | 48.06 |
| Fertilizer nutrients - | | | | | | |
| N | Pound | 270.0 | 1/ | 1/ | 100 | |
| $P_2O_5$ | Pound | 178.4 | 1/ | 1/ | 88 | 71.82 |
| $K_2O$ | Pound | 137.5 | 1/ | 1/ | 72 | |
| Spray materials 2/ | Pound | 153.4 | .11 | 16.87 | 90 | 15.18 |
| Dust materials | Pound | 57.5 | .11 | 6.32 | 72 | 4.55 |
| Crates | Each | 730.0 | .41 | 299.30 | 45 | 134.68 |
| Cartons | Each | 740.0 | .27 | 199.80 | 40 | 79.92 |
| Irrigation fees | Acre-inch | 68.0 | .23 | 15.64 | 100 | 15.64 |
| Total | --- | --- | --- | --- | --- | 392.41 |
| Contract work hired: | | | | | | |
| Spread manure | Acre | 1.0 | 2.00 | 2.00 | 73 | 1.46 |
| List and fertilize, application only | Acre | 1.0 | 3.00 | 3.00 | 14 | .42 |
| Fertilize, application only | Acre | 6.7 | 2.00 | 13.40 | 88 | 11.79 |
| Cultivate and fertilize, application only | Acre | 4.0 | 1.75 | 7.00 | 2 | .14 |
| Spray by boom sprayer, application only | Acre | 1.9 | 2.13 | 4.05 | 90 | 3.64 |
| Spray by boom sprayer, includes materials | Acre | 1.9 | 12.36 | 23.48 | 16 | 3.76 |
| Spray by plane, application only | Acre | 1.0 | 2.00 | 2.00 | 9 | .18 |
| Dust by plane, application only | Acre | 1.0 | 2.00 | 2.00 | 72 | 1.44 |
| Dust by plane, includes materials | Acre | 4.0 | 15.00 | 60.00 | 4 | 2.40 |
| Total | --- | --- | --- | --- | --- | 25.23 |
| Total, materials and contract work | --- | --- | --- | --- | --- | 3/ 417.64 |

1/ Data not available.
2/ Includes herbicides and insecticides.
3/ Average yield per acre - 332 hundredweight. Average cost of materials and contract work per hundredweight - $1.26.

Table B.--Celery: Labor, power, and equipment used for producing and harvesting, averages for 736 acres on 11 farms, Monterey County, Calif., 1958-59

| Operation | Type and size of equipment | Time per acre, once over: Man | Time per acre, once over: Power | Times over, acreage covered | Percentage of total acreage covered | Time per acre, total acreage: Man | Time per acre, total acreage: Power |
|---|---|---|---|---|---|---|---|
| | | Hours | Hours | Number | Percent | Hours | Hours |
| Preharvest: | | | | | | | |
| Disk | 14-foot disk | 0.3 | 0.3 | 1.7 | 100 | 0.5 | 0.5 |
| Chisel | 10-foot chisel | .5 | .5 | 1.3 | 100 | .6 | .6 |
| Spread manure (custom) | Truck spreader | .2 | .2 | 1.0 | 73 | .1 | .1 |
| List | 3-bed lister | .6 | .6 | 1.8 | 23 | .2 | .2 |
| List and fertilize (custom) | 3-bed lister/attach. | .6 | .6 | 1.0 | 14 | .1 | .1 |
| List and seed | 3-bed lister/seeder | .9 | .8 | 1.0 | 63 | .6 | .5 |
| Shape beds | 3-bed shaper | .4 | .4 | 1.0 | 100 | .4 | .4 |
| Level | 10 x 40-foot landplane | .8 | .8 | 1.5 | 9 | .1 | .1 |
| Seed | 3-bed seeder | 1.0 | 1.0 | 1.0 | 37 | 1/ | 1/ |
| Fertilize (custom) | 3-bed applicator | .3 | .3 | 6.7 | 88 | 1.8 | 1.8 |
| Irrigate | --- | 3.5 | --- | 16.9 | 100 | 59.2 | --- |
| Cultivate | 3-bed cultivator | .5 | .5 | 4.9 | 100 | 2.4 | 2.4 |
| Cultivate and fertilize (custom) | 3-bed cult. /attach. | .3 | .3 | 4.0 | 2 | 1/ | 1/ |
| Spray (custom) | 8-bed boom sprayer | .2 | .2 | 2.2 | 96 | .4 | .4 |
| Spray (custom) | Plane | 1/ | 1/ | 1.0 | 9 | 1/ | 1/ |
| Dust (custom) | Plane | 1/ | 1/ | 1.1 | 76 | 1/ | 1/ |
| Thin | --- | 46.4 | --- | 1.0 | 100 | 46.4 | --- |
| Hoe and weed | --- | 26.5 | --- | 1.0 | 80 | 21.2 | --- |
| Total | --- | --- | --- | --- | --- | 134.0 | 7.1 |
| Harvest: | | | | | | | |
| Cut, field pack, and close cartons or crates | Trailer and machine stitcher | 261.0 | 9.9 | 1.0 | 2/ 85 | 221.8 | 8.4 |
| Total | --- | --- | --- | --- | --- | 3/ 221.8 | 3/ 8.4 |
| Total preharvest and harvest | --- | --- | --- | --- | --- | 4/ 355.8 | 4/ 15.5 |

1/ Less than 0.05 hour. 2/ The remaining acreage was harvested by labor contractors and shed packed. Growers could not estimate harvest labor and power inputs. 3/ Excludes hauling.
4/ Average yield per acre - 332 hundredweight. Average labor and power used per hundredweight - 1.07 hours and 0.05 hour, respectively.

Table C.--Celery: Usual labor and power inputs, Monterey County, Calif., 1958-59

| Operation | Times over | Time per acre, once over | | Time per acre, total | |
|---|---|---|---|---|---|
| | | Man | Power | Man | Power |
| | Number | Hours | Hours | Hours | Hours |
| Disk | 2 | 0.3 | 0.3 | 0.6 | 0.6 |
| Chisel | 1 | .5 | .5 | .5 | .5 |
| Spread manure (custom) | 1 | .2 | .2 | .2 | .2 |
| List and seed | 1 | .9 | .8 | .9 | .8 |
| Shape beds | 1 | .4 | .4 | .4 | .4 |
| Fertilize (custom) | 7 | .3 | .3 | 2.1 | 2.1 |
| Irrigate | 17 | 3.5 | --- | 59.5 | --- |
| Cultivate | 5 | .5 | .5 | 2.5 | 2.5 |
| Spray (custom) | 2 | 1/ | 1/ | 1/ | 1/ |
| Dust (custom) | 1 | 1/ | 1/ | 1/ | 1/ |
| Thin | 1 | 46.4 | --- | 46.4 | --- |
| Hoe and weed | 1 | 26.5 | --- | 26.5 | --- |
| Harvest | 1 | 261.0 | 9.9 | 261.0 | 9.9 |
| Total | --- | --- | --- | 400.6 | 17.0 |

1/ Less than 0.05 hour.

Table D.--Celery: Distribution of workers performing specified operations, by type of worker, 11 farms, Monterey County, Calif., 1958-59

| Operation | Type of worker | | | | |
|---|---|---|---|---|---|
| | Operator and unpaid family | Year-round hired | Local seasonal | Foreign | Custom |
| | Percent | Percent | Percent | Percent | Percent |
| Disk | 20 | 70 | 10 | 0 | 0 |
| Chisel | 30 | 50 | 20 | 0 | 0 |
| Spread manure | 0 | 0 | 0 | 0 | 100 |
| List | 50 | 50 | 0 | 0 | 0 |
| List and fertilize | 0 | 0 | 0 | 0 | 100 |
| List and seed | 0 | 100 | 0 | 0 | 0 |
| Shape beds | 33 | 45 | 22 | 0 | 0 |
| Level | 25 | 75 | 0 | 0 | 0 |
| Seed | 40 | 37 | 23 | 0 | 0 |
| Fertilize | 0 | 0 | 0 | 0 | 100 |
| Irrigate | 14 | 27 | 59 | 0 | 0 |
| Cultivate | 42 | 42 | 16 | 0 | 0 |
| Cultivate and fertilize | 0 | 0 | 0 | 0 | 100 |
| Spray | 0 | 0 | 0 | 0 | 100 |
| Dust | 0 | 0 | 0 | 0 | 100 |
| Thin | 0 | 0 | 18 | 82 | 0 |
| Hoe and weed | 0 | 0 | 9 | 91 | 0 |
| Harvest | 0 | 0 | 31 | 69 | 0 |

## Lettuce

Figure 6 and tables A, B, C, and D present data on the growing and harvesting of lettuce from 7,687 acres on 52 farms in 1958-59. The average yield per acre was 401 cartons (2-dozen heads, or approximately 43 pounds).

Tractors were the chief source of power on these farms. Size of tractor was not obtained in the survey; the size of equipment used for operations listed indicates that the average tractor was a 3- or 4-bottom tractor with a drawbar horsepower rating of 20 to 40. Major preplant operations were powered by 40- to 60-horsepower crawler tractors.

Growers relied heavily upon custom operators to perform many of the operations other than land preparation. Fertilizing, spraying, and dusting operations were performed almost entirely by custom operators.

The harvesting of lettuce in the 1958-59 season was typically handcut, field packed, stapled, and loaded onto trucks for transport to vacuum cooling plants. This survey obtained harvest labor inputs on the total of all harvesting operations except the hauling to vacuum coolers. Inputs for specific operations such as cutting, carton forming, packing, stapling, and loading were not obtained. Harvesting of nearly two-thirds of the acreage was performed by crews supervised by the operator. On the remaining acreage, lettuce was either sold in the field or harvested by grower cooperative or labor contractor's crews, and labor inputs were not obtainable from the farm operators.

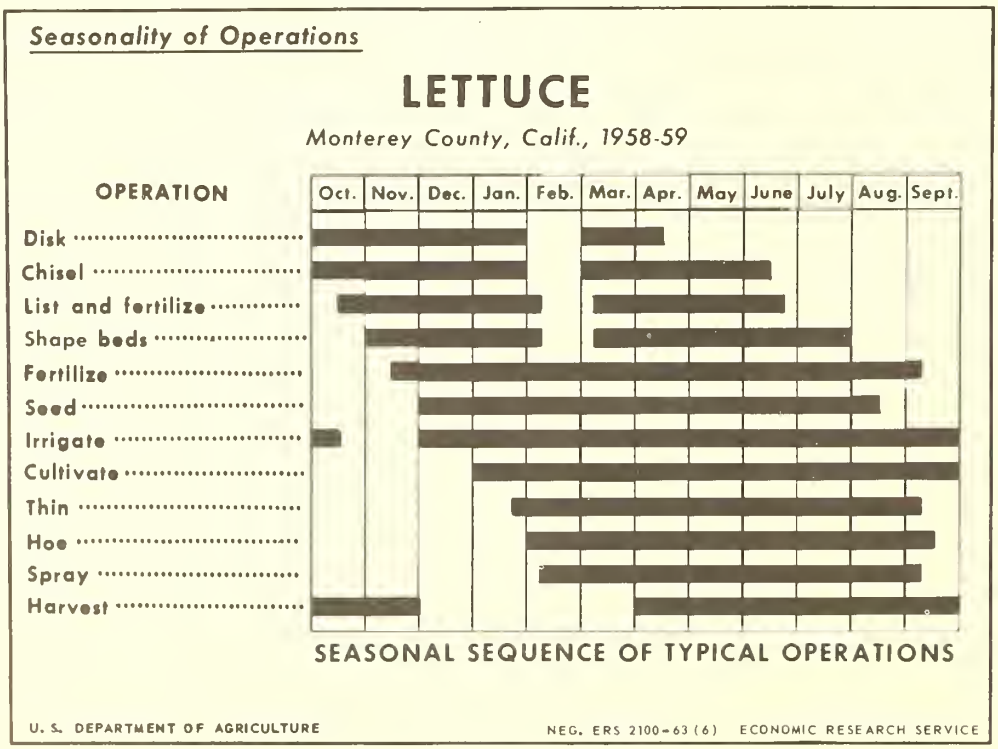


Figure 6

Table A.--Lettuce: Materials used and contract work hired, averages for 7,687 acres on 52 farms, Monterey County, Calif., 1958-59

| Item | Unit | Units per acre covered | Price per unit | Cost per acre covered | Percentage of total acreage covered | Cost per acre, total acreage |
|---|---|---|---|---|---|---|
| | | Number | Dollars | Dollars | Percent | Dollars |
| Materials used: | | | | | | |
| Seed | Pound | 1.37 | 7.29 | 9.99 | 100 | 9.99 |
| Manure | Ton | 4.10 | 8.37 | 34.32 | 43 | 14.76 |
| Fertilizer nutrients - | | | | | | |
| N | Pound | 151.0 | 1/ | 1/ | 100 | 47.56 |
| $P_2O_5$ | Pound | 141.7 | 1/ | 1/ | 100 | |
| $K_2O$ | Pound | 149.8 | 1/ | 1/ | 97 | |
| Spray materials | Application | 2.7 | 6.22 | 16.79 | 12 | 2.01 |
| Dust materials | Application | 2.4 | 7.78 | 18.67 | 4 | .75 |
| Cartons | Each | 401.0 | .25 | 100.25 | 64 | 64.16 |
| Irrigation water | Acre-inch | 30.0 | .23 | 6.90 | 100 | 6.90 |
| Total | --- | --- | --- | --- | --- | 146.13 |
| Contract work hired: | | | | | | |
| List and fertilize, no materials | Acre | 1.0 | 2.97 | 2.97 | 46 | 1.37 |
| Fertilize, no materials | Acre | 2.3 | 2.02 | 4.65 | 88 | 4.09 |
| Spray by boom sprayer, no materials | Acre | 2.6 | 1.76 | 4.58 | 12 | .55 |
| Spray by boom sprayer, materials included | Acre | 2.1 | 9.43 | 19.80 | 74 | 14.65 |
| Dust by ground duster, no materials | Acre | 2.4 | 2.08 | 4.99 | 4 | .20 |
| Dust by plane, materials included | Acre | 3.1 | 11.91 | 36.92 | 2 | .74 |
| Spray by plane, materials included | Acre | 1.4 | 10.84 | 15.18 | 8 | 1.21 |
| Spread manure, application only | Acre | 1.0 | 1.00 | 1.00 | 43 | .43 |
| Total | --- | --- | --- | --- | --- | 23.24 |
| Total, materials and contract work | --- | --- | --- | --- | --- | 2/ 169.37 |

1/ Data not available.
2/ Average yield per acre - 401 cartons. Average cost of materials and contract work per carton - $0.42.

Table B.--Lettuce: Labor, power, and machinery used in producing and harvesting, averages for 7,687 acres on 52 farms, Monterey County, Calif., 1958-59

| Operation | Type and size of equipment | Time per acre, once over | | Times over, acreage covered | Percentage of total acreage covered | Time per acre, total acreage | |
|---|---|---|---|---|---|---|---|
| | | Man | Power | | | Man | Power |
| | | Hours | Hours | Number | Percent | Hours | Hours |
| Preharvest: | | | | | | | |
| Plow | 4 14-inch bottoms | 1.0 | 1.0 | 1.0 | 44 | 0.4 | 0.4 |
| Disk | 12-foot disk | .7 | .7 | 2.0 | 100 | 1.4 | 1.4 |
| Chisel | 10-foot chisel | .6 | .6 | 2.0 | 53 | .6 | .6 |
| Landplane | 10 x 40-foot landplane | .8 | .8 | 1.0 | 14 | .1 | .1 |
| List | 3-bed lister | .5 | .5 | 1.0 | 42 | .2 | .2 |
| List and fertilize (custom) | 4-bed lister/attach. | .7 | .6 | 1.0 | 46 | .3 | .3 |
| Spread manure (custom) | Truck spreader | .4 | .4 | 1.0 | 43 | .2 | .2 |
| Shape beds | 2-bed shaper | .9 | .9 | 1.0 | 90 | .8 | .8 |
| Fertilize (custom) | 4-bed applicator | .4 | .4 | 2.3 | 88 | .8 | .8 |
| Seed | 4-bed planter | 1.3 | .5 | 1.0 | 100 | 1.3 | .5 |
| Irrigate | --- | 2.2 | --- | 5.3 | 100 | 11.7 | --- |
| Cultivate | 2-bed cultivator | .8 | .8 | 3.6 | 100 | 2.9 | 2.9 |
| Cultivate and fertilize | 4-bed lister/attach. | .3 | .3 | 2.0 | 21 | .1 | .1 |
| Thin | --- | 22.1 | --- | 1.0 | 99 | 21.9 | --- |
| Hoe | --- | 14.0 | --- | 1.0 | 97 | 13.6 | --- |
| Spray (custom) | 8-bed boom sprayer | .2 | .2 | 2.2 | 86 | .4 | .4 |
| Spray (custom) | Plane | 1/ | 1/ | 1.4 | 8 | 1/ | 1/ |
| Dust (custom) | 6-bed duster | .3 | .3 | 2.4 | 4 | 1/ | 1/ |
| Dust (custom) | Plane | 1/ | 1/ | 3.1 | 2 | 1/ | 1/ |
| Total | --- | --- | --- | --- | --- | 56.7 | 8.7 |
| Harvest: | | | | | | | |
| Cut, field pack, stitch, load and haul | Trucks and stitcher | 29.2 | 2.1 | 3.5 | 2/ 64 | 65.4 | 4.7 |
| Total | --- | --- | --- | --- | --- | 65.4 | 4.7 |
| Total, preharvest and harvest | --- | --- | --- | --- | --- | 3/ 122.1 | 3/ 13.4 |

1/ Less than 0.05 hour.

2/ The remaining 36 percent of the acreage was harvested by cooperative supplied crews, sold in the field, or harvested by labor contractor's crews, and no inputs were available.

3/ Average yield per acre - 401 cartons. Average labor and power used for carton - 0.30 hour and 0.03 hour, respectively.

Table C.--Lettuce: Usual labor and power inputs, Monterey County, Calif., 1958-59

| Operation | Times over | Time per acre, once over | | Time per acre, total | |
|---|---|---|---|---|---|
| | | Man | Power | Man | Power |
| | Number | Hours | Hours | Hours | Hours |
| Disk | 2 | 0.7 | 0.7 | 1.4 | 1.4 |
| Chisel | 2 | .6 | .6 | 1.2 | 1.2 |
| List and fertilize (custom) | 1 | .7 | .6 | .7 | .6 |
| Shape beds | 1 | .9 | .9 | .9 | .9 |
| Fertilize (custom) | 2 | .4 | .4 | .8 | .8 |
| Seed | 1 | 1.3 | .5 | 1.3 | .5 |
| Irrigate | 5 | 2.2 | --- | 11.0 | --- |
| Cultivate | 4 | .8 | .8 | 3.2 | 3.2 |
| Thin | 1 | 22.1 | --- | 22.1 | --- |
| Hoe | 1 | 14.0 | --- | 14.0 | --- |
| Spray (custom) | 2 | .2 | .2 | .4 | .4 |
| Harvest | 3.5 | 29.2 | 2.1 | 102.2 | 7.4 |
| Total | --- | --- | --- | 159.2 | 16.4 |

Table D.--Lettuce: Distribution of workers performing specified operations, by type of worker, 52 farms, Monterey County, Calif., 1958-59

| Operation | Type of worker | | | | | |
|---|---|---|---|---|---|---|
| | Operator and unpaid family | Year-round hired | Local seasonal | Domestic migratory | Foreign | Custom |
| | Percent | Percent | Percent | Percent | Percent | Percent |
| Plow | 33 | 67 | 0 | 0 | 0 | 0 |
| Disk | 27 | 70 | 3 | 0 | 0 | 0 |
| Chisel | 27 | 69 | 4 | 0 | 0 | 0 |
| Landplane | 32 | 68 | 0 | 0 | 0 | 0 |
| List | 21 | 73 | 6 | 0 | 0 | 0 |
| List and fertilize | 0 | 0 | 0 | 0 | 0 | 100 |
| Spread manure | 0 | 0 | 0 | 0 | 0 | 100 |
| Shape beds | 27 | 73 | 0 | 0 | 0 | 0 |
| Fertilize | 0 | 0 | 0 | 0 | 0 | 100 |
| Seed | 34 | 62 | 4 | 0 | 0 | 0 |
| Irrigate | 11 | 20 | 69 | 0 | 0 | 0 |
| Cultivate | 27 | 69 | 3 | 1 | 0 | 0 |
| Cultivate and fertilize | 25 | 70 | 5 | 0 | 0 | 0 |
| Thin | 0 | 2 | 23 | 6 | 69 | 0 |
| Hoe | 0 | 0 | 13 | 10 | 77 | 0 |
| Spray, ground rig | 0 | 0 | 0 | 0 | 0 | 100 |
| Spray, plane | 0 | 0 | 0 | 0 | 0 | 100 |
| Dust, ground rig | 0 | 0 | 0 | 0 | 0 | 100 |
| Dust, plane | 0 | 0 | 0 | 0 | 0 | 100 |
| Harvest | 0 | 0 | 19 | 0 | 81 | 0 |

## Onions

Figure 7 and tables A, B, C, and D present data on the growing and harvesting of dry onions from 496 acres on 10 farms in 1958-59. The average yield per acre was 395 hundredweight.

Tractors were the chief source of power on these farms. While size of tractor was not obtained in the survey, the size of equipment used for operations listed indicates the average tractor to be a 3- or 4-bottom tractor with a drawbar horsepower rating of 20 to 40. Plowing, disking, and leveling operations were powered by 40- to 60-horsepower crawler tractors.

Onion producers have been adopting new technology in the production of this crop. Prior to the development and adoption of reliable chemical weed killers, onion growers were forced to use large amounts of labor per acre for hand hoeing and hand weeding. The development of successful pre-emergence and post-emergence selective herbicides has enabled the onion grower to reduce the bulk of hand hoeing and weeding. Nearly 80 percent of the onion acreage in this survey was treated with selective herbicides. All growers who used chemical weed killers hired custom operators to perform the operation. Hand hoeing was restricted to only one time on less than half the acreage; weeding was also performed once but on only 12 percent of the acreage.

The harvesting of onions is quite variable. Some growers sold the crop growing in the field; others lifted or pulled the onions and then sold them; still others lifted and topped the onions, and then hired a labor contractor to provide a crew for hand pick up; and, finally, some of the acreage was harvested mechanically. Insufficient data were obtained to permit other than partial analysis of harvest labor and power inputs.

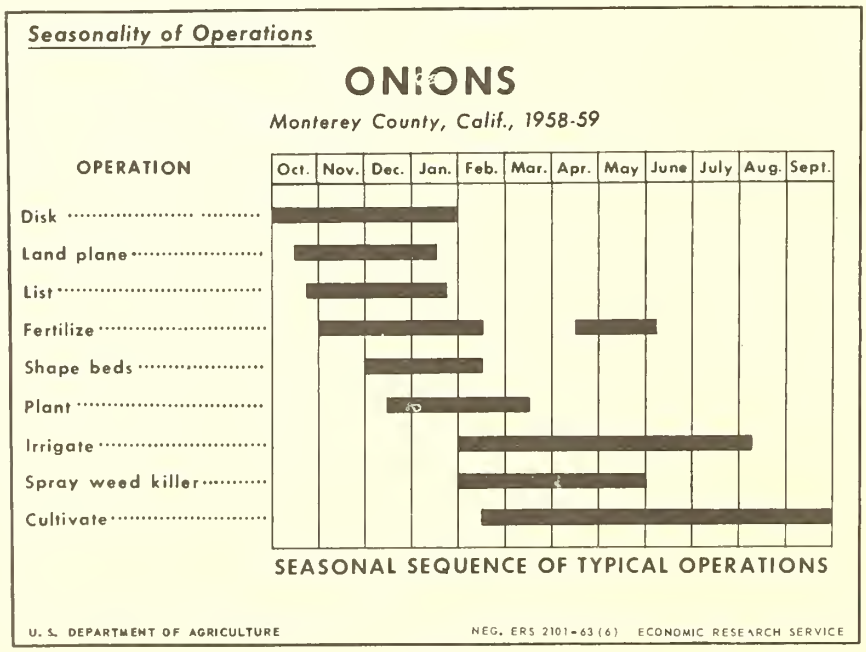


Figure 7

Table A.--Onions: Materials used and contract work hired, averages for 496 acres on 10 farms, Monterey County, Calif., 1958-59

| Item | Unit | Units per acre covered | Price per unit | Cost per acre covered | Percentage of total acreage covered | Cost per acre, total acreage |
|---|---|---|---|---|---|---|
| | | Number | Dollars | Dollars | Percent | Dollars |
| Materials used: | | | | | | |
| Seed | Pound | 5.0 | 3.78 | 18.90 | 100 | 18.90 |
| Fertilizer nutrients - | | | | | | |
| N | Pound | 189.7 | 1/ | 1/ | 100 | 38.50 |
| $P_2O_5$ | Pound | 86.3 | 1/ | 1/ | 100 | |
| $K_2O$ | Pound | 47.9 | 1/ | 1/ | 69 | |
| Sacks | Each | 703.0 | .20 | 140.60 | 13 | 18.28 |
| Irrigation water | Acre-inch | 48.2 | .23 | 10.86 | 100 | 10.86 |
| Total | --- | --- | --- | --- | --- | 86.54 |
| Contract work hired: | | | | | | |
| Spray weedkiller, includes materials | Acre | 2.8 | 12.69 | 35.53 | 78 | 27.71 |
| Spray insecticides and fungicides, includes materials | Acre | 1.5 | 8.55 | 12.82 | 27 | 3.46 |
| Fertilize, application only | Acre | 1.4 | 2.32 | 3.25 | 100 | 3.25 |
| Undercut, top, and lift onions | Ton | 12.7 | 2.40 | 30.48 | 41 | 12.50 |
| Total | --- | --- | --- | --- | --- | 46.92 |
| Total, materials and contract work | --- | --- | --- | --- | --- | 2/ 133.46 |

1/ Data not available.
2/ Average yield per acre - 395 hundredweight. Average cost of materials and contract work per hundredweight - $0.34.

Table B.--Onions: Labor, power, and machinery used in growing and harvesting, averages for 496 acres on 10 farms, Monterey County, Calif., 1958-59

| Operation | Type and size of equipment | Time per acre, once over | | Times over, acreage covered | Percentage of total acreage covered | Time per acre, total acreage | |
|---|---|---|---|---|---|---|---|
| | | Man | Power | | | Man | Power |
| | | Hours | Hours | Number | Percent | Hours | Hours |
| Preharvest: | | | | | | | |
| Plow | 4 16-inch bottoms | 1.4 | 1.4 | 1.0 | 22 | 0.3 | 0.3 |
| Disk | 12-ft. disk | .6 | .6 | 1.5 | 79 | .7 | .7 |
| Disk and roll | 13-ft. disk and roller | 1.2 | 1.2 | 4.5 | 21 | 1.1 | 1.1 |
| Landplane | 10 x 40-ft. landplane | .6 | .6 | 1.1 | 50 | .3 | .3 |
| Chisel and roll | 7-ft. chisel and roller | 1.0 | 1.0 | 1.0 | 21 | .2 | .2 |
| Chisel | 11-ft. chisel | .5 | .5 | 2.0 | 38 | .4 | .4 |
| List | 4-bed lister | .4 | .4 | 1.0 | 100 | .4 | .4 |
| Fertilize (custom) | 3-bed drill | .3 | .3 | 1.4 | 100 | .4 | .4 |
| Shape beds | 4-bed shaper | .5 | .5 | 1.3 | 100 | .6 | .6 |
| Roll beds | 14-ft. roller | .7 | .7 | 1.0 | 21 | .1 | .1 |
| Plant | 4-bed planter | 1.0 | .6 | 1.0 | 100 | 1.0 | .6 |
| Irrigate | --- | 2.0 | --- | 9.7 | 100 | 19.4 | --- |
| Spray weeds (custom) | 8-bed sprayer | .2 | .2 | 2.8 | 78 | .4 | .4 |
| Cultivate | --- | .7 | .7 | 4.4 | 100 | 3.1 | 3.1 |
| Hoe | --- | 20.1 | --- | 1.9 | 47 | 17.9 | --- |
| Spray insecticides and fungicides (custom) | 8-bed sprayer | .2 | .2 | 1.5 | 27 | .1 | .1 |
| Weed | --- | 9.3 | --- | 1.0 | 12 | 1.1 | --- |
| Total | --- | --- | --- | --- | --- | 47.5 | 8.7 |
| Harvest: | | | | | | | |
| Lift | Onion digger | 1.0 | 1.0 | 1.0 | 48 | .5 | .5 |
| Undercut, top and lift (custom) | Digger and topper | 3.5 | 3.5 | 1.0 | 41 | 1.4 | 1.4 |
| Pick and sack | Onion harvester | 42.6 | 2.9 | 1.0 | 41 | 17.5 | 1.2 |
| Total 1/ | --- | --- | --- | --- | --- | 19.4 | 3.1 |
| Total, preharvest and harvest 1/ | --- | --- | --- | --- | --- | 2/ 66.9 | 2/ 11.8 |

1/ Excludes all grading, loading, and hauling inputs. Also excludes lifting on 11 percent of acreage, and undercut, top, pick and sack on 59 percent of the acreage. Growers did not estimate harvest inputs on this acreage. Some production was sold in the field. 2/ Average yield per acre - 395 hundredweight. Average labor and power used per hundredweight - 0.17 hour and 0.03 hour, respectively.

Table C.--Onions: Usual labor and power inputs, Monterey County, Calif., 1958-59

| Operation | Times over | Time per acre, once over | | Time per acre, total | |
|---|---|---|---|---|---|
| | | Man | Power | Man | Power |
| | Number | Hours | Hours | Hours | Hours |
| Disk | 2 | 0.6 | 0.6 | 1.2 | 1.2 |
| Landplane | 1 | .6 | .6 | .6 | .6 |
| List | 1 | .4 | .4 | .4 | .4 |
| Fertilize (custom) | 1 | .3 | .3 | .3 | .3 |
| Shape beds | 1 | .5 | .5 | .5 | .5 |
| Plant | 1 | 1.0 | .6 | 1.0 | .6 |
| Irrigate | 10 | 2.0 | --- | 20.0 | --- |
| Spray weeds (custom) | 3 | .2 | .2 | .6 | .6 |
| Cultivate | 4 | .7 | .7 | 2.8 | 2.8 |
| Total 1/ | --- | --- | | 27.4 | 7.0 |

1/ Inputs for harvesting were omitted because a majority of growers did not use any one set of operations.

Table D.--Onions: Distribution of workers performing specified operations, by type of worker, 10 farms, Monterey County, Calif., 1958-59

| Operation | Type of worker | | | | | |
|---|---|---|---|---|---|---|
| | Operator and unpaid family | Year-round hired | Local seasonal | Domestic migratory | Foreign | Custom |
| | Percent | Percent | Percent | Percent | Percent | Percent |
| Plow | 0 | 100 | 0 | 0 | 0 | 0 |
| Disk | 20 | 80 | 0 | 0 | 0 | 0 |
| Disk and roll | 0 | 100 | 0 | 0 | 0 | 0 |
| Landplane | 14 | 86 | 0 | 0 | 0 | 0 |
| Chisel and roll | 0 | 100 | 0 | 0 | 0 | 0 |
| Chisel | 29 | 71 | 0 | 0 | 0 | 0 |
| List | 30 | 70 | 0 | 0 | 0 | 0 |
| Fertilize | 0 | 0 | 0 | 0 | 0 | 100 |
| Shape beds | 18 | 82 | 0 | 0 | 0 | 0 |
| Roll beds | 0 | 100 | 0 | 0 | 0 | 0 |
| Plant | 14 | 86 | 0 | 0 | 0 | 0 |
| Irrigate | 0 | 24 | 41 | 0 | 35 | 0 |
| Spray weeds | 0 | 0 | 0 | 0 | 0 | 100 |
| Cultivate | 15 | 85 | 0 | 0 | 0 | 0 |
| Hoe | 0 | 0 | 14 | 3 | 83 | 0 |
| Spray insecticides and fungicides | 0 | 0 | 0 | 0 | 0 | 100 |
| Weed | 0 | 0 | 0 | 0 | 100 | 0 |
| Lift | 0 | 100 | 0 | 0 | 0 | 0 |
| Lift and top | 0 | 0 | 0 | 0 | 0 | 100 |
| Pull and top by hand | 0 | 0 | 69 | 0 | 31 | 0 |
| Pick up and sack | 0 | 10 | 70 | 0 | 20 | 0 |

## Tomatoes

Figure 8 and tables A, B, C, and D present data on the growing and harvesting of tomatoes on 191 acres on 6 farms in 1958-59. Yield per acre averaged 253.7 hundredweight of green wrap and pink tomatoes. Excluded from analysis in this section are substantial quantities of ripe tomatoes which went to processing plants.

Tractors were the chief source of power on these farms. Size of tractor was not obtained in the survey, but size of equipment used for operations listed indicates the average tractor to be a 3- or 4-plow tractor with a drawbar horsepower rating of 20 to 40. Power to plow, disk, chisel, and landplane was provided by 40- to 60-horsepower crawler tractors.

Tomatoes were direct-seeded on all farms, but a small portion of the acreage was transplanted in conjunction with a thinning operation.

All acreage was picked for early green wrap and pink tomatoes for fresh market use, but when the crop matured, the ripe tomatoes were harvested for canning. The data presented here exclude any harvesting inputs used for the canning tomatoes.

Growers generally did not supervise the crews picking fresh market tomatoes. They either hired a labor contractor to harvest the crop, or sold it in the field. Only 28 percent of the acreage was harvested by farmer-supervised crews.

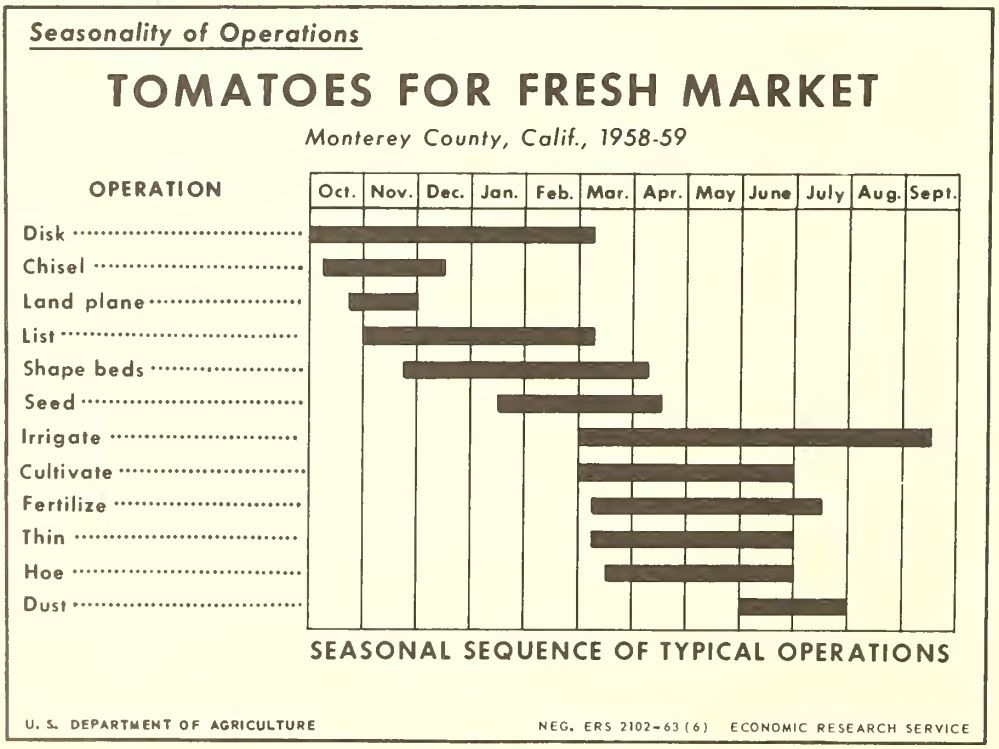


Figure 8

Table A.--Tomatoes: Materials used and contract work hired, averages for 191 acres on 6 farms, Monterey County, Calif., 1958-59

| Item | Unit | Units per acre covered | Price per unit | Cost per acre covered | Percentage of total acreage covered | Cost per acre, total acreage |
|---|---|---|---|---|---|---|
| | | Number | Dollars | Dollars | Percent | Dollars |
| Materials used: | | | | | | |
| Seed | Pound | 1.0 | 9.70 | 9.70 | 100 | 9.70 |
| Manure | Ton | .5 | 10.00 | 5.00 | 2 | .10 |
| Fertilizer nutrients - | | | | | | |
| N | Pound | 186.3 | 1/ | 1/ | 98 | |
| $P_2O_5$ | Pound | 95.9 | 1/ | 1/ | 98 | 48.41 |
| $K_2O$ | Pound | 67.3 | 1/ | 1/ | 79 | |
| Pesticides | Pound | 102.0 | .16 | 16.32 | 80 | 13.06 |
| Irrigation water | Acre-inch | 35.0 | .23 | 8.05 | 100 | 8.05 |
| Total | --- | --- | --- | --- | --- | 79.32 |
| Contract work hired: | | | | | | |
| Apply fertilizer, no materials | Acre | 2.3 | 2.00 | 4.60 | 79 | 3.63 |
| List and fertilize, no materials | Acre | 2.0 | 3.00 | 6.00 | 26 | 1.56 |
| Dust by plane, no materials | Acre | 1.7 | 2.00 | 3.40 | 80 | 2.72 |
| Dust by ground duster, materials included | Acre | 1.0 | 8.00 | 8.00 | 20 | 1.60 |
| Total | --- | --- | --- | --- | --- | 9.51 |
| Total, materials and contract work | --- | --- | --- | --- | --- | 2/ 88.83 |

1/ Data not available.

2/ Average yield per acre - 253.7 hundredweight. Average cost of materials and contract work per hundredweight - $0.32, excluding cost of baskets for picking and hauling.

Table B.--Tomatoes: Labor, power, and machinery used in producing and harvesting, averages for 191 acres on 6 farms, Monterey County, Calif., 1958-59

| Operation | Type and size of equipment | Time per acre, once over | | Times over, acreage covered | Percentage of total acreage covered | Time per acre, total acreage | |
|---|---|---|---|---|---|---|---|
| | | Man | Power | | | Man | Power |
| | | Hours | Hours | Number | Percent | Hours | Hours |
| Preharvest: | | | | | | | |
| Plow | 4 14-inch bottoms | 0.4 | 0.4 | 1.0 | 26 | 0.1 | 0.1 |
| Disk | 10-ft. disk | .4 | .4 | 2.0 | 100 | .8 | .8 |
| Chisel | 10-ft. chisel | .4 | .4 | 1.3 | 98 | .5 | .5 |
| Landplane | 10 x 40-ft. landplane | .6 | .6 | 1.0 | 72 | .4 | .4 |
| List | 3-bed lister | .6 | .6 | 1.0 | 74 | .4 | .4 |
| List and fertilize (custom) | 3-bed lister/attach. | .7 | .7 | 2.0 | 26 | .4 | .4 |
| Shape beds | 3-bed shaper | .6 | .6 | 1.2 | 100 | .7 | .7 |
| Seed | 4-bed planter | .8 | .5 | 1.0 | 100 | .8 | .5 |
| Roll | 2-bed roller | .2 | .2 | 1.0 | 26 | .1 | .1 |
| Transplant | --- | 16.0 | --- | 1.0 | 2 | .3 | --- |
| Irrigate | --- | 1.9 | --- | 5.4 | 100 | 10.3 | --- |
| Cultivate | 2-bed cultivator | .5 | .5 | 5.2 | 100 | 2.6 | 2.6 |
| Fertilize (custom) | 8-row boom sprayer | .2 | .2 | 2.3 | 79 | .4 | .4 |
| Fertilize | 2-bed distributor | .3 | .3 | 1.0 | 19 | .1 | .1 |
| Spread manure | --- | 10.7 | --- | 1.0 | 2 | .2 | --- |
| Thin | --- | 13.1 | --- | 1.0 | 98 | 12.8 | --- |
| Hoe | --- | 8.1 | --- | 1.3 | 100 | 10.5 | --- |
| Dust (custom) | Plane | 1/ | 1/ | 1.7 | 80 | 1/ | 1/ |
| Dust (custom) | 6-row duster | .3 | .3 | 1.0 | 20 | .1 | .1 |
| Dust | --- | 4.0 | --- | 3.0 | 2 | .2 | --- |
| Total | --- | --- | --- | --- | --- | 41.7 | 7.1 |
| Harvest: | | | | | | | |
| Pick and load by hand and haul by truck | Truck | 25.3 | .9 | 6.8 | 2/ 28 | 48.2 | 1.7 |
| Total | --- | --- | --- | --- | --- | 48.2 | 1.7 |
| Total, preharvest and harvest | --- | --- | --- | --- | --- | 3/ 89.9 | 3/ 8.8 |

1/ Less than 0.05 hour. 2/ The remaining acreage was either sold in the field or harvested by a labor contractor. Farmers could not estimate labor and power inputs. 3/ Average yield per acre - 253.7 hundredweight. Average labor and power used per hundredweight - 0.35 hour and 0.03 hour, respectively.

Table C.--Tomatoes: Usual labor and power inputs, Monterey County, Calif., 1958-59

| Operation | Times over | Time per acre, once over | | Time per acre, total | |
|---|---|---|---|---|---|
| | | Man | Power | Man | Power |
| | Number | Hours | Hours | Hours | Hours |
| Disk | 2 | 0.4 | 0.4 | 0.8 | 0.8 |
| Chisel | 1 | .4 | .4 | .4 | .4 |
| Landplane | 1 | .6 | .6 | .6 | .6 |
| List | 1 | .6 | .6 | .6 | .6 |
| Shape beds | 1 | .6 | .6 | .6 | .6 |
| Seed | 1 | .8 | .5 | .8 | .5 |
| Irrigate | 5 | 1.9 | --- | 9.5 | --- |
| Cultivate | 5 | .5 | .5 | 2.5 | 2.5 |
| Fertilize (custom) | 2 | .2 | .2 | .4 | .4 |
| Thin | 1 | 13.1 | --- | 13.1 | --- |
| Hoe | 1 | 8.1 | --- | 8.1 | --- |
| Dust by plane (custom) | 2 | 1/ | 1/ | 1/ | 1/ |
| Total | --- | --- | --- | 37.6 | 6.4 |

1/ Less than 0.05 hour.

Table D.--Tomatoes: Distribution of workers performing specified operations, by type of worker, 6 farms, Monterey County, Calif., 1958-59

| Operation | Type of worker | | | | |
|---|---|---|---|---|---|
| | Operator and unpaid family | Year-round hired | Local seasonal | Foreign | Custom |
| | Percent | Percent | Percent | Percent | Percent |
| Plow | 100 | 0 | 0 | 0 | 0 |
| Disk | 29 | 57 | 14 | 0 | 0 |
| Chisel | 20 | 80 | 0 | 0 | 0 |
| Landplane | 25 | 75 | 0 | 0 | 0 |
| List | 33 | 67 | 0 | 0 | 0 |
| List and fertilize | 0 | 0 | 0 | 0 | 100 |
| Shape beds | 20 | 80 | 0 | 0 | 0 |
| Seed | 14 | 86 | 0 | 0 | 0 |
| Roll | 100 | 0 | 0 | 0 | 0 |
| Transplant | 0 | 0 | 100 | 0 | 0 |
| Irrigate | 20 | 80 | 0 | 0 | 0 |
| Cultivate | 17 | 83 | 0 | 0 | 0 |
| Fertilize | 0 | 20 | 0 | 0 | 80 |
| Spread manure | 0 | 0 | 100 | 0 | 0 |
| Thin | 0 | 0 | 31 | 69 | 0 |
| Hoe | 0 | 12 | 2 | 86 | 0 |
| Dust by plane | 0 | 0 | 0 | 0 | 100 |
| Dust by row duster | 0 | 0 | 0 | 0 | 100 |
| Dust by hand | 100 | 0 | 0 | 0 | 0 |
| Harvest | 4 | 0 | 9 | 87 | 0 |

## VEGETABLES FOR PROCESSING

This section contains information on the production and harvesting of two important processing crops – spinach and tomatoes. All of the production from the spinach acreage was sent to processors. Some early pink tomatoes were harvested from the acreage for processing and sold on the fresh market. Data reported here are for only that portion of the crop to be processed.

### Spinach

Figure 9 and tables A, B, C, and D present data on the growing of spinach for processing from 466 acres on 8 farms in 1958-59. The average yield per acre was 8.6 tons.

Tractors were the chief source of power on these farms. Size of tractor was not obtained, but size of equipment used for operations listed indicates that the average tractor was a 3- or 4-plow tractor with a drawbar horsepower rating of 20 to 40. Power to plow, disk, chisel, landplane, and float was provided by 40- to 60-horsepower crawler tractors.

The entire acreage of spinach on these farms was produced under contract with processors. Certain managerial decisions were specified under the contracts, such as kind and amount of seed; type, rate, and application of fertilizer; pesticide control; and planting date and time of harvest. All growers indicated that they did not participate in the harvest but, rather, had the processor send in a harvest crew or hired a labor contractor to conduct the harvest. No harvest labor or power inputs were obtained.

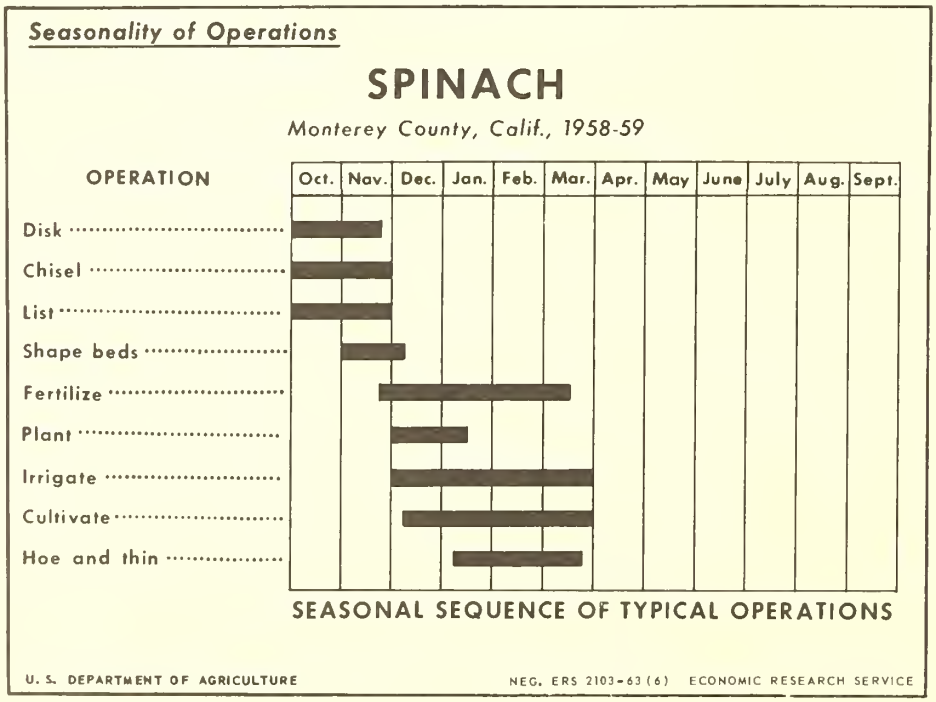


Figure 9

Table A.--Spinach: Materials used and contract work hired, averages for 466 acres on 8 farms, Monterey County, Calif., 1958-59

| Item | Unit | Units per acre covered | Price per unit | Cost per acre covered | Percentage of total acreage covered | Cost per acre, total acreage |
|---|---|---|---|---|---|---|
| | | Number | Dollars | Dollars | Percent | Dollars |
| Materials used: | | | | | | |
| Seed | Pound | 13.6 | 0.31 | 4.22 | 100 | 4.22 |
| Fertilizer nutrients - | | | | | | |
| N | Pound | 154.6 | 1/ | 1/ | 100 | |
| $P_2O_5$ | Pound | 64.6 | 1/ | 1/ | 100 | 31.92 |
| $K_2O$ | Pound | 19.5 | 1/ | 1/ | 33 | |
| Pesticides | Application | 1.4 | 8.45 | 11.83 | 46 | 5.44 |
| Irrigation water | Acre-inch | 18.0 | .23 | 4.14 | 100 | 4.14 |
| Total | --- | --- | --- | --- | --- | 45.72 |
| Contract work hired: | | | | | | |
| Apply fertilizer, no materials | Acre | 2.4 | 2.00 | 4.80 | 91 | 4.37 |
| Apply pesticides, no materials | Acre | 1.4 | 2.00 | 2.80 | 46 | 1.29 |
| Dust by plane, includes materials | Acre | 1.0 | 11.00 | 11.00 | 3 | .33 |
| Total | --- | --- | --- | --- | --- | 5.99 |
| Total, materials and contract work | --- | --- | --- | --- | --- | 2/ 51.71 |

1/ Data not available.
2/ Average yield per acre - 8.6 tons. Average cost of materials and contract work per ton - $6.01.

Table B.--Spinach: Labor, power, and machinery used in growing, averages for 466 acres on 8 farms, Monterey County, Calif., 1958-59

| Operation | Type and size of equipment | Time per acre, once over | | Times over, acreage covered | Percentage of total acreage covered | Time per acre, total acreage | |
|---|---|---|---|---|---|---|---|
| | | Man | Power | | | Man | Power |
| | | Hours | Hours | Number | Percent | Hours | Hours |
| Preharvest: | | | | | | | |
| Plow | 4 14-inch bottoms | 0.5 | 0.5 | 1.0 | 9 | 1/ | 1/ |
| Disk | 14-foot disk | .5 | .5 | 1.7 | 100 | 0.8 | 0.8 |
| Chisel | 10-foot chisel | .6 | .6 | 1.6 | 91 | .9 | .9 |
| Landplane | 10 x 60-foot landplane | 1.1 | 1.1 | 1.0 | 18 | .2 | .2 |
| Float | 10 x 30-foot float | .4 | .4 | 1.6 | 30 | .2 | .2 |
| List | 3-bed lister | .3 | .3 | 1.0 | 100 | .3 | .3 |
| Shape beds | 3-bed shaper | .4 | .4 | 2.1 | 85 | .7 | .7 |
| Fertilize | 3-bed applicator | .3 | .3 | 2.4 | 100 | .7 | .7 |
| Plant | 2-bed planter | .8 | .5 | 1.0 | 100 | .8 | .5 |
| Irrigate | --- | 1.9 | --- | 3.7 | 100 | 7.0 | --- |
| Cultivate | 2-bed cultivator | .6 | .6 | 4.0 | 100 | 2.4 | 2.4 |
| Hoe and weed | --- | 20.8 | --- | 1.0 | 100 | 20.8 | --- |
| Cultivate and fertilize | 2-bed cult./attach. | .7 | .5 | 1.0 | 24 | .2 | .1 |
| Dust (custom) | 6-bed duster | .2 | .2 | 1.4 | 46 | .1 | .1 |
| Dust (custom) | Plane | 1/ | 1/ | 1.0 | 3 | 1/ | 1/ |
| Total 2/ | --- | --- | | --- | --- | 3/ 35.1 | 3/ 6.9 |

1/ Less than 0.05 hour.

2/ No harvest labor or power inputs were obtained, as the entire acreage was harvested by processor's or labor contractor's crews.

3/ Average yield per acre - 8.6 tons. Average preharvest labor and power used per ton - 4.1 hours and 0.8 hour, respectively.

Table C.--Spinach: Usual labor and power inputs, Monterey County, Calif., 1958-59

| Operation | Times over | Time per acre, once over | | Time per acre, total | |
|---|---|---|---|---|---|
| | | Man | Power | Man | Power |
| | Number | Hours | Hours | Hours | Hours |
| Disk | 2 | 0.5 | 0.5 | 1.0 | 1.0 |
| Chisel | 2 | .6 | .6 | 1.2 | 1.2 |
| List | 1 | .3 | .3 | .3 | .3 |
| Shape beds | 2 | .4 | .4 | .8 | .8 |
| Fertilize | 2 | .3 | .3 | .6 | .6 |
| Plant | 1 | .8 | .5 | .8 | .5 |
| Irrigate | 4 | 1.9 | --- | 7.6 | --- |
| Cultivate | 4 | .6 | .6 | 2.4 | 2.4 |
| Hoe and weed | 1 | 20.8 | --- | 20.8 | --- |
| Total | --- | --- | --- | 35.5 | 6.8 |

Table D.--Spinach: Distribution of workers performing specified operations, by type of worker, 8 farms, Monterey County, Calif., 1958-59

| Operation | Type of worker | | | | |
|---|---|---|---|---|---|
| | Operator and unpaid family | Year-round hired | Local seasonal | Foreign | Custom |
| | Percent | Percent | Percent | Percent | Percent |
| Plow | 100 | 0 | 0 | 0 | 0 |
| Disk | 50 | 30 | 20 | 0 | 0 |
| Chisel | 57 | 29 | 14 | 0 | 0 |
| Landplane | 100 | 0 | 0 | 0 | 0 |
| Float | 33 | 67 | 0 | 0 | 0 |
| List | 56 | 22 | 22 | 0 | 0 |
| Shape beds | 72 | 14 | 14 | 0 | 0 |
| Fertilize | 17 | 0 | 0 | 0 | 83 |
| Plant | 57 | 22 | 21 | 0 | 0 |
| Irrigate | 55 | 18 | 27 | 0 | 0 |
| Cultivate | 45 | 33 | 22 | 0 | 0 |
| Hoe and weed | 0 | 0 | 69 | 31 | 0 |
| Cultivate and fertilize | 70 | 19 | 11 | 0 | 0 |
| Dust by plane | 0 | 0 | 0 | 0 | 100 |
| Dust by ground rig | 0 | 0 | 0 | 0 | 100 |

## Tomatoes

Figure 10 and tables A, B, C, and D present data on the growing and harvesting of tomatoes for processing from 1,178 acres on 19 farms in 1958-59. The average yield per acre was 25.1 tons of ripe tomatoes. All of the acreage of tomatoes for processing was produced under contract with processing plants.

Tractors were the chief source of power on these farms. Size of tractor was not obtained, but size of equipment used for operations listed indicates the average tractor to be a 3- or 4-plow tractor with a drawbar horsepower rating of 20 to 40. Power to plow, disk, chisel, and land level was provided by 40- to 60-horsepower crawler tractors.

Tomatoes grown for processing required work each month of the year. Land preparation began in October of 1958, and harvesting was concluded in November 1959. Preharvest operations were highly mechanized and used little labor except for irrigating, thinning, and hoeing. The greatest amount of labor was used in harvesting – nearly 190 hours per acre.

Workers picking tomatoes were generally paid piece rates. These rates ranged from $0.16 to $0.225 per 50-pound box and averaged $0.21.

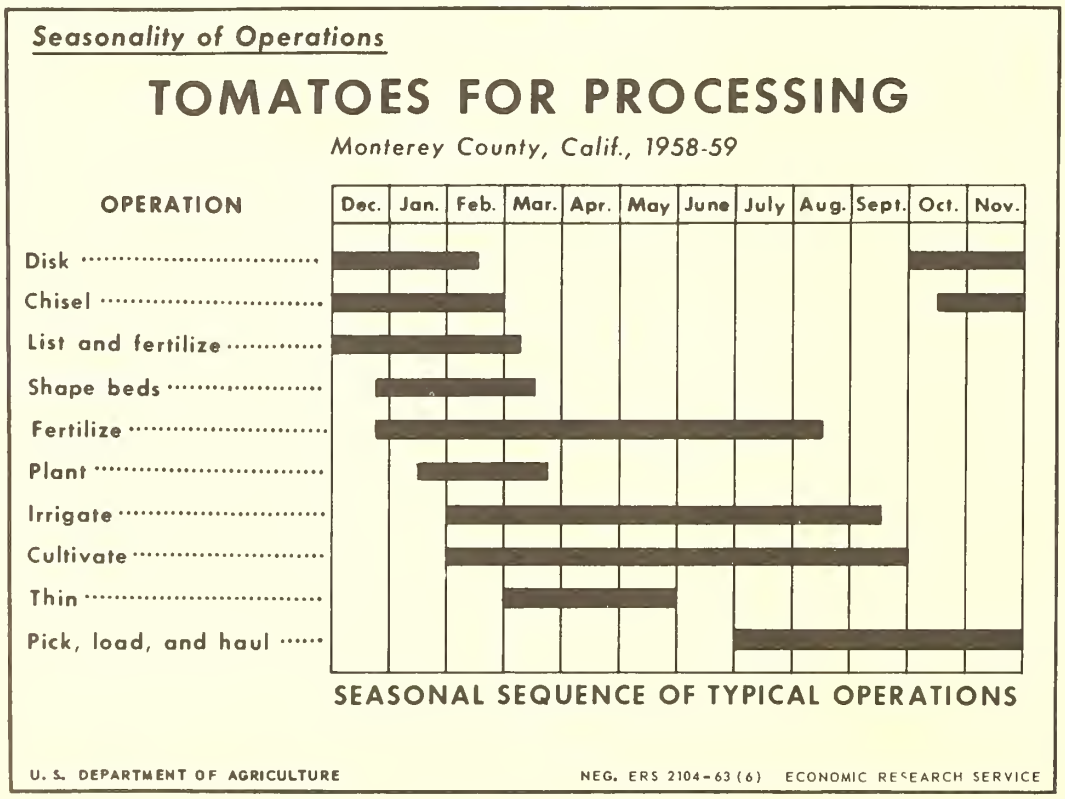


Figure 10

Table A.--Tomatoes: Materials used and contract work hired, averages for 1,178 acres on 19 farms, Monterey County, Calif., 1958-59

| Item | Unit | Units per acre covered | Price per unit | Cost per acre covered | Percentage of total acreage covered | Cost per acre, total acreage |
|---|---|---|---|---|---|---|
| | | Number | Dollars | Dollars | Percent | Dollars |
| Materials used: | | | | | | |
| Seed | Pound | 0.75 | 9.41 | 7.06 | 100 | 7.06 |
| Fertilizer nutrients - | | | | | | |
| N | Pound | 117.3 | 1/ | 1/ | 86 | |
| $P_2O_5$ | Pound | 86.6 | 1/ | 1/ | 86 | 27.00 |
| $K_2O$ | Pound | 24.8 | 1/ | 1/ | 40 | |
| Dust | Pound | 44.7 | .09 | 4.02 | 40 | 1.61 |
| Spray materials | Acre | 1.7 | 3.65 | 6.20 | 12 | .75 |
| Irrigation water | Acre-inch | 33.6 | .23 | 7.73 | 100 | 7.73 |
| Field boxes | Each | 41.0 | .28 | 11.48 | 88 | 10.10 |
| Total | --- | --- | --- | --- | --- | 54.25 |
| Contract work hired: | | | | | | |
| List and fertilize, includes fertilizer | Acre | 1.4 | 13.91 | 19.47 | 14 | 2.73 |
| List and fertilize, no materials | Acre | 1.0 | 2.92 | 2.92 | 25 | .73 |
| Fertilize, no materials | Acre | 1.9 | 2.00 | 3.80 | 62 | 2.36 |
| Fertilize, includes fertilizer | Acre | 1.0 | 17.50 | 17.50 | 3 | .52 |
| Cultivate and fertilize, no materials | Acre | 1.0 | 1.75 | 1.75 | 4 | .07 |
| Dust by row duster, no materials | Acre | 1.8 | 2.00 | 3.60 | 36 | 1.30 |
| Dust by plane, no materials | Acre | 1.9 | 2.00 | 3.80 | 9 | .34 |
| Dust by plane, includes dust | Acre | 1.3 | 8.31 | 10.80 | 18 | 1.94 |
| Spray by row sprayer, no materials | Acre | 1.7 | 1.92 | 3.26 | 12 | .39 |
| Spray by row sprayer, includes spray | Acre | 1.0 | 10.00 | 10.00 | 4 | .40 |
| Total | --- | --- | --- | --- | --- | 10.78 |
| Total, materials and contract work | --- | --- | --- | --- | | 2/ 65.03 |

1/ Data not available.
2/ Average yield per acre - 25.1 tons. Average cost of materials and contract work per ton - $2.59.

Table B.--Tomatoes: Labor, power, and machinery used in producing and harvesting, averages for 1,178 acres on 19 farms, Monterey County, Calif., 1958-59

| Operation | Type and size of equipment | Time per acre, once over: Man | Time per acre, once over: Power | Times over, acreage covered | Percentage of total acreage covered | Time per acre, total acreage: Man | Time per acre, total acreage: Power |
|---|---|---|---|---|---|---|---|
| | | Hours | Hours | Number | Percent | Hours | Hours |
| Preharvest: | | | | | | | |
| Plow | 3 14-inch bottoms | 1.0 | 1.0 | 1.0 | 32 | 0.3 | 0.3 |
| Disk | 12-ft. disk | .5 | .5 | 2.0 | 100 | 1.0 | 1.0 |
| Roll | 8-ft. ring roll | .5 | .5 | 1.0 | 15 | .1 | .1 |
| Chisel | 10-ft. chisel | .6 | .6 | 1.5 | 55 | .5 | .5 |
| Landplane | 10 x 60-ft. landplane | .6 | .6 | 1.6 | 46 | .4 | .4 |
| List | 3-bed lister | .4 | .4 | 1.0 | 33 | .1 | .1 |
| List and fertilize (custom) | 3-bed lister/attach. | .6 | .6 | 1.0 | 39 | .2 | .2 |
| List and fertilize | 3-bed lister/attach. | .6 | .6 | 1.0 | 28 | .2 | .2 |
| Shape beds | 3-bed shaper | .6 | .6 | 1.0 | 90 | .5 | .5 |
| Fertilize (custom) | 3-bed applicator | .2 | .2 | 1.8 | 65 | .2 | .2 |
| Plant | 2-bed planter | .9 | .7 | 1.0 | 100 | .9 | .7 |
| Irrigate | --- | 1.8 | --- | 5.6 | 100 | 10.1 | --- |
| Cultivate | 2-bed cultivator | .7 | .7 | 3.6 | 100 | 2.5 | 2.5 |
| Cultivate and fertilize (custom) | 2-bed cult./attach. | .7 | .7 | 1.0 | 4 | 1/ | 1/ |
| Thin | --- | 14.9 | --- | 1.0 | 75 | 11.2 | --- |
| Spray (custom) | 8-bed boom sprayer | .3 | .3 | 2.0 | 12 | .1 | .1 |
| Hoe | --- | 8.3 | --- | 1.7 | 46 | 6.5 | --- |
| Weed | --- | 5.6 | --- | 1.2 | 32 | 2.1 | --- |
| Dust (custom) | 8-bed duster | .2 | .2 | 1.8 | 36 | .1 | .1 |
| Dust (custom) | Plane | 1/ | 1/ | 1.5 | 27 | 1/ | 1/ |
| Total | --- | --- | --- | --- | --- | 37.0 | 6.9 |
| Harvest: | | | | | | | |
| Pick and load by hand, and haul by truck | Trucks | 51.0 | 2.6 | 3.1 | 2/ 92 | 145.3 | 7.4 |
| Total | --- | --- | --- | --- | --- | 145.3 | 7.4 |
| Total, preharvest and harvest | --- | --- | --- | --- | --- | 3/ 182.3 | 3/ 14.3 |

1/ Less than 0.05 hour. 2/ Production on the remaining acreage was sold in the field.
3/ Average yield per acre - 25.1 tons. Average labor and power used per ton - 7.26 hours and 0.58 hour, respectively.

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Table C.--Tomatoes: Usual labor and power inputs, Monterey County, Calif., 1958-59

| Operation | Times over | Time per acre, once over | | Time per acre, total | |
|---|---|---|---|---|---|
| | | Man | Power | Man | Power |
| | Number | Hours | Hours | Hours | Hours |
| Disk | 2 | 0.5 | 0.5 | 1.0 | 1.0 |
| Chisel | 2 | .6 | .6 | 1.2 | 1.2 |
| List and fertilize | 1 | .6 | .6 | .6 | .6 |
| Shape beds | 1 | .6 | .6 | .6 | .6 |
| Fertilize (custom) | 2 | .2 | .2 | .4 | .4 |
| Plant | 1 | .9 | .7 | .9 | .7 |
| Irrigate | 6 | 1.8 | --- | 10.8 | --- |
| Cultivate | 4 | .7 | .7 | 2.8 | 2.8 |
| Thin | 1 | 14.9 | --- | 14.9 | --- |
| Hoe | 2 | 8.3 | --- | 16.6 | --- |
| Pick and load by hand, and haul by truck | 3 | 51.0 | 2.6 | 153.0 | 7.8 |
| Total | --- | --- | --- | 203.2 | 15.1 |

Table D.--Tomatoes: Distribution of workers performing specified operations, by type of worker, 19 farms, Monterey County, Calif., 1958-59

| Operation | Type of worker | | | | |
|---|---|---|---|---|---|
| | Operator and unpaid family | Year-round hired | Local seasonal | Foreign | Custom |
| | Percent | Percent | Percent | Percent | Percent |
| Plow | 40 | 60 | 0 | 0 | 0 |
| Disk | 38 | 58 | 4 | 0 | 0 |
| Roll | 75 | 25 | 0 | 0 | 0 |
| Chisel | 43 | 50 | 7 | 0 | 0 |
| Landplane | 46 | 54 | 0 | 0 | 0 |
| List | 56 | 33 | 11 | 0 | 0 |
| List and fertilize | 10 | 30 | 0 | 0 | 70 |
| Shape beds | 27 | 73 | 0 | 0 | 0 |
| Fertilize | 0 | 0 | 0 | 0 | 100 |
| Plant | 28 | 59 | 13 | 0 | 0 |
| Irrigate | 32 | 42 | 23 | 3 | 0 |
| Cultivate | 35 | 57 | 8 | 0 | 0 |
| Cultivate and fertilize | 0 | 0 | 0 | 0 | 100 |
| Thin | 0 | 12 | 4 | 84 | 0 |
| Spray | 0 | 0 | 0 | 0 | 100 |
| Hoe | 0 | 0 | 1 | 99 | 0 |
| Weed | 0 | 0 | 0 | 100 | 0 |
| Dust by plane | 0 | 0 | 0 | 0 | 100 |
| Dust by row duster | 0 | 0 | 0 | 0 | 100 |
| Pick and load by hand, and haul by truck | 0 | 7 | 5 | 88 | 0 |

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